DERWENT-ACC-NO: 2001-462994

DERWENT-WEEK: 200150

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TITLE: Method and system for remote study between many users using internet

INVENTOR: JANG, W J

PATENT-ASSIGNEE: INBCLUB CO LTD[INBCN] , JANG W J[JANGI]

PRIORITY-DATA: 2000KR-0042343 (July 24, 2000)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
KR 2001007738 A	February 5, 2001	N/A	001	G06F 019/00

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
KR2001007738A	N/A	2000KR-0042343	July 24, 2000

INT-CL (IPC): G06F019/00

ABSTRACTED-PUB-NO: KR2001007738A

BASIC-ABSTRACT:

NOVELTY - A method and a system for remote study between many users using the internet are provided to enable many users to talk and study through voice or letter interfaces and image screen regardless of time and place. Therefore, efficiency of study is improved.

DETAILED DESCRIPTION - A user, who enters a study room, selects a lecture subject.(300) An ASP is driven.(301) Data are analyzed, processed(302) and stored in a lecture DB.(303) User's categories by language, subject and age is produced according to the data stored in the lecture DB(304). When the user requests a subject and a participant information(305), data is analyzed and processed.(306) According to the user's request, the participant information

ZOOZ 009953311

LANGUAGE SEARCH

	Type	Hits	Search Text
1	BRS	50	("5924090" "6334145" "6026432" "6035325" "6067560" "6006222" "6199076" "6393423" "6304864" "6701362" "6345288" "6292830" "6078916" "6167370" "5913215" "6112202" "5956027" "6178460" "6314432" "6397219" "6466940" "6539375" "5721827" "6035294" "6195652" "6243699" "5999929" "6334131" "6336112" "6356899" "6311194" "5933827"

	DBs	Time Stamp	Comments
1	USPAT	2004/05/28 14:54	

	Error Definition	Errors
1		0

	Type	Hits	Search Text
2	BRS	243	("6549897" "6038668" "6360227" "6413100" "6125395" "6167435" "5862325" "6078921" "6088717" "6119078" "6131110" "6363337" "6182066" "5963913" "6163779" "5920864" "6449598" "6457009" "5774123" "6209100" "5940843" "6282404" "6404441" "5321609" "5937418" "5778367" "6199080" "6324538" "6338068" "6670968" "6674453" "6056549"
3	BRS	26	(search query browse) SAME (Categor$8 classif$8 subject theme) WITH (select$4 choos$4 chos$4 pick$4 display$4) WITH (channel number id or identif$6) SAME (Web html) NEAR (page file
4	BRS	58	(search query browse) SAME (Categor$8 classif$8 subject theme) WITH (select$4 choos$4 chos$4 pick$4 display$4) WITH (channel number id or identif$6) SAME (Web html) NEAR (page file
5	BRS	12930	707/$6.ccls.
6	BRS	7520	707/$6.ccls.
7	BRS	26	((search query browse) SAME (Categor$8 classif$8 subject theme) WITH (select$4 choos$4 chos$4 pick$4 display$4) WITH (channel number id or identif$6) SAME (Web html) NEAR (page file document)) and 707/$6.ccls.

	DBs	Time Stamp	Comments
2	USPAT	2004/05/28 14:54	
3	USPAT	2004/05/29 21:52	
4	US-PGPUB	2004/05/29 21:33	
5	USPAT	2004/05/29 20:59	
6	US-PGPUB	2004/05/29 21:00	
7	US-PGPUB	2004/05/29 21:00	

	Error Definition	Errors
2		0
3		0
4		0
5		0
6		0
7		0

	Type	Hits	Search Text
8	BRS	3	(search query browse) SAME (Categor$8 classif$8 subject theme) WITH (select$4 choos$4 chos$4 pick$4 display$4) WITH (channel number id or identif$6) SAME (Web html) NEAR (page file
9	BRS	7	(search query browse) SAME (Categor$8 classif$8 subject theme) WITH (select$4 choos$4 chos$4 pick$4 display$4) WITH (channel number id or identif$6) SAME (Web html)
10	BRS	36	(search query browse) SAME (Categor$8 classif$8 subject theme) WITH (channel number id or identif$6) SAME (Web html)
11	BRS	1	(search query browse) SAME (Categor$8 classif$8 subject theme) WITH (channel number id or identif$6) SAME (Web html) SAME
12	BRS	2	(search query browse) SAME (Categor$8 classif$8 subject theme) WITH (select$4 choos$4 chos$4 pick$4 display$4) WITH (Language) SAME (Web html)
13	BRS	25	(search query browse) SAME (Categor$8 classif$8 subject theme) SAME (select$4 choos$4 chos$4 pick$4 display$4) WITH (Language)
14	BRS	50	(search query browse) SAME (Categor$8 classif$8 subject theme) WITH (select$4 choos$4 chos$4 pick$4 display$4) WITH language
15	BRS	43	(search query browse) SAME (Categor$8 classif$8 subject theme) WITH (select$4 choos$4 chos$4 pick$4) WITH language
16	BRS	8	(search query browse) SAME (Categor$8 classif$8 subject theme) WITH (select$4 choos$4 chos$4 pick$4) WITH language.ti,ab,clm.
17	BRS	26	707/$6.ccls. and ((search query browse) SAME (Categor$8 classif$8 subject theme) WITH (select$4 choos$4 chos$4 pick$4) WITH
18	BRS	27	(search query browse) SAME (Categor$8 classif$8 subject theme) WITH (select$4 choos$4 chos$4 pick$4) WITH language

	DBs	Time Stamp	Comments
8	EPO; JPO; DERWENT; IBM_TDB	2004/05/29 21:37	
9	EPO; JPO; DERWENT; IBM_TDB	2004/05/29 21:41	
10	EPO; JPO; DERWENT; IBM_TDB	2004/05/29 21:39	
11	EPO; JPO; DERWENT; IBM_TDB	2004/05/29 21:39	
12	EPO; JPO; DERWENT; IBM_TDB	2004/05/29 21:43	
13	EPO; JPO; DERWENT; IBM_TDB	2004/05/29 21:43	
14	USPAT	2004/05/29 21:52	
15	USPAT	2004/05/29 22:05	
16	USPAT	2004/05/29 21:56	
17	USPAT	2004/05/29 21:57	
18	US-PGPUB	2004/05/29 22:05	

	Error Definition	Errors
8		0
9		0
10		0
11		0
12		0
13		0
14		0
15		0
16		0
17		0
18		0

US006728705B2

(12) **United States Patent**
Licon et al.

(10) **Patent No.: US 6,728,705 B2**
(45) **Date of Patent: Apr. 27, 2004**

(54) **SYSTEM AND METHOD FOR SELECTING CONTENT FOR DISPLAYING OVER THE INTERNET BASED UPON SOME USER INPUT**

(75) Inventors: **Roberto Licon**, El Paso, TX (US); **Andrew Bensky**, Scotts Valley, CA (US); **Erik Swan**, Palo Alto, CA (US); **Paul Ingram**, Pleasanton, CA (US); **Naga Pappireddi**, San Jose, CA (US); **Michael D. Fox**, San Jose, CA (US)

(73) Assignee: **Disney Enterprises, Inc.**, Burbank, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/946,061**

(22) Filed: **Sep. 4, 2001**

(65) **Prior Publication Data**

US 2003/0035000 A1 Feb. 20, 2003

Related U.S. Application Data

(60) Provisional application No. 60/229,779, filed on Sep. 1, 2000.

(51) **Int. Cl.**[7] **G06F 17/30**

(52) **U.S. Cl.** **707/3**; 707/4; 707/10; 707/104.1; 709/217; 709/219; 709/203; 715/501.1; 715/513

(58) **Field of Search** ..... 707/3, 5, 2, 10, 707/102, 104.1, 4, 6, 103 R; 709/218, 219, 206, 225, 217; 715/500, 513, 501.1; 345/747

(56) **References Cited**

U.S. PATENT DOCUMENTS

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6,112,203	A *	8/2000	Bharat et al.	707/5
6,311,194	B1 *	10/2001	Sheth et al.	707/505
6,327,628	B1 *	12/2001	Anuff et al.	709/311
6,446,065	B1 *	9/2002	Nishioka et al.	707/5
6,457,004	B1 *	9/2002	Nishioka et al.	707/5
2001/0037359	A1 *	11/2001	Mockett et al.	709/203

* cited by examiner

Primary Examiner—Charles Rones
Assistant Examiner—Jacques Veillard
(74) *Attorney, Agent, or Firm*—Greenberg Traurig LLP; Margo Maddux; Donald L. Wenskay, Esq.

(57) **ABSTRACT**

The present invention provides a method for displaying information from the Internet. In one embodiment, the invention generates a plurality of content modules, each content module comprising a subset of the content of at least one web site. The content modules are then stored in a content module data directory. When a query is received from a user, the query is assigned to at least one content module. The results of the query are displayed on two regions of the user's screen. On a first region of the user's display screen a list of information relating to the plurality of retrieved web sites is displayed. On a second region of said display screen, information from said at least one content module associated with the query is displayed.

8 Claims, 21 Drawing Sheets

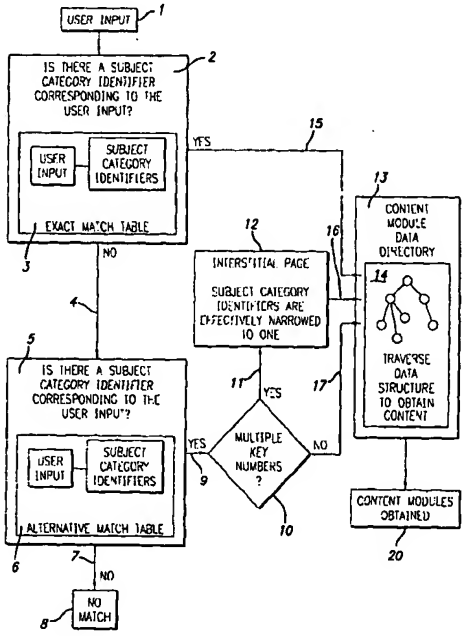
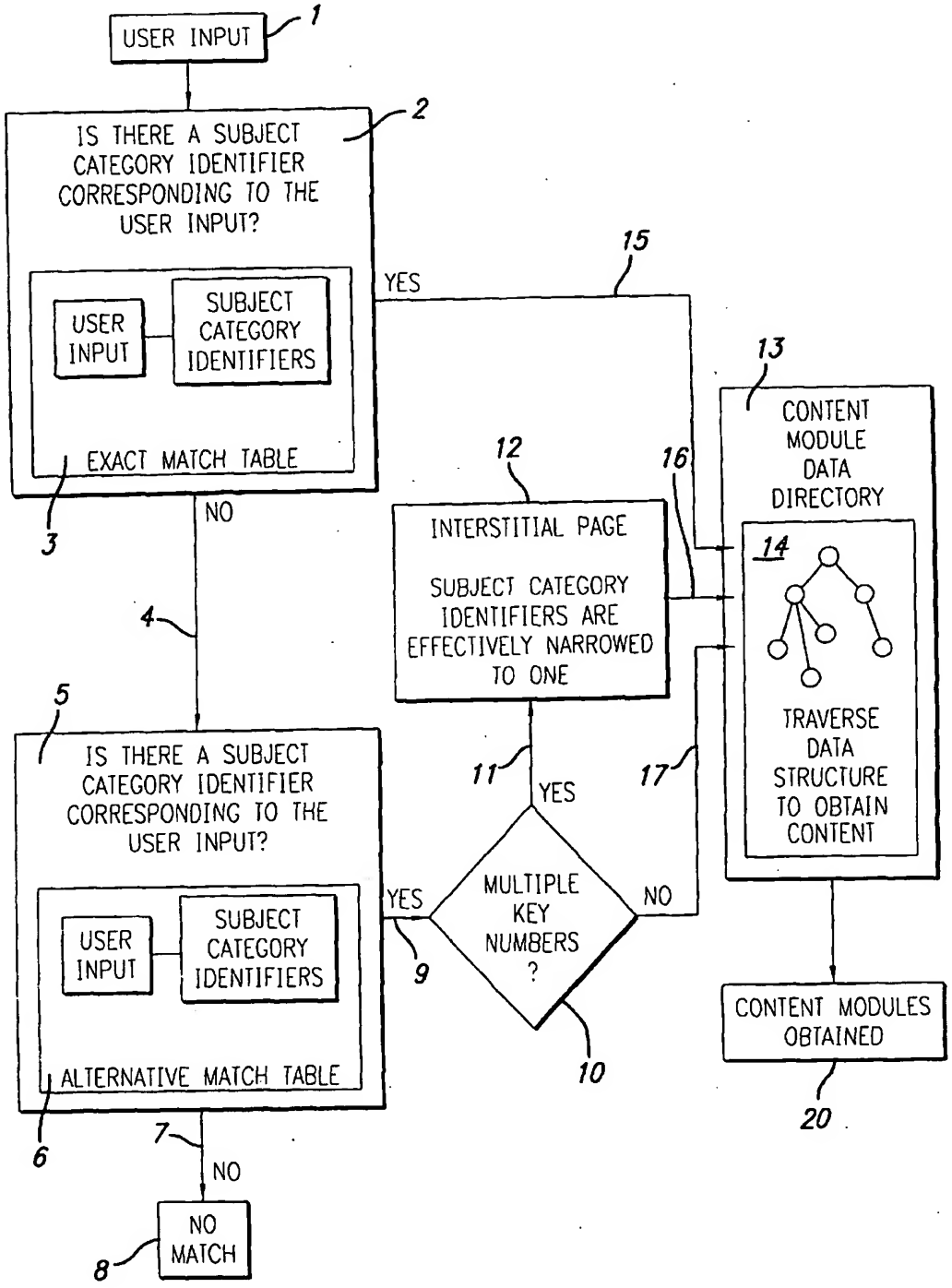


FIG. 1


USER INPUT
1
IS THERE A SUBJECT CATEGORY IDENTIFIER CORRESPONDING TO THE USER INPUT?
2
USER INPUT
SUBJECT CATEGORY IDENTIFIERS
EXACT MATCH TABLE
3
YES
15
NO
4
INTERSTITIAL PAGE
SUBJECT CATEGORY IDENTIFIERS ARE EFFECTIVELY NARROWED TO ONE
12
16
CONTENT MODULE DATA DIRECTORY
13
14
TRAVERSE DATA STRUCTURE TO OBTAIN CONTENT
5
IS THERE A SUBJECT CATEGORY IDENTIFIER CORRESPONDING TO THE USER INPUT?
11
YES
17
MULTIPLE KEY NUMBERS ?
YES
NO
9
10
USER INPUT
SUBJECT CATEGORY IDENTIFIERS
ALTERNATIVE MATCH TABLE
6
7
NO
NO MATCH
8
CONTENT MODULES OBTAINED
20

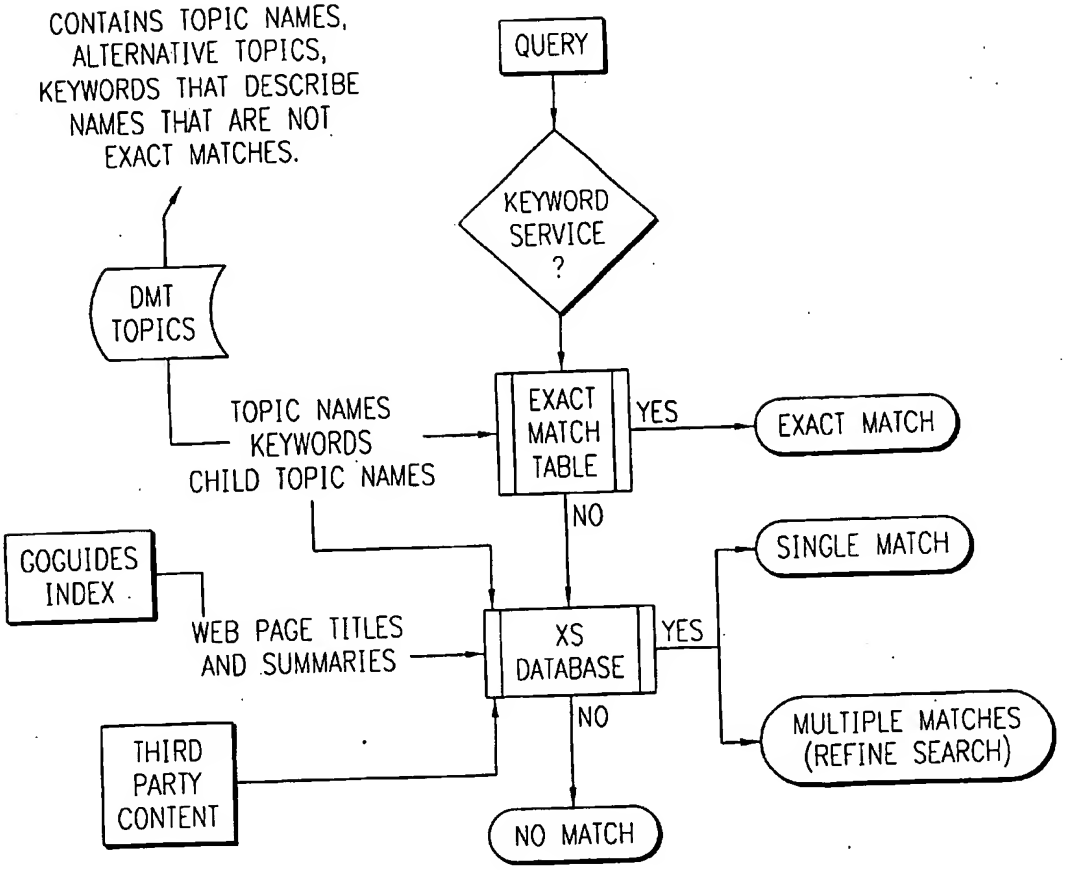
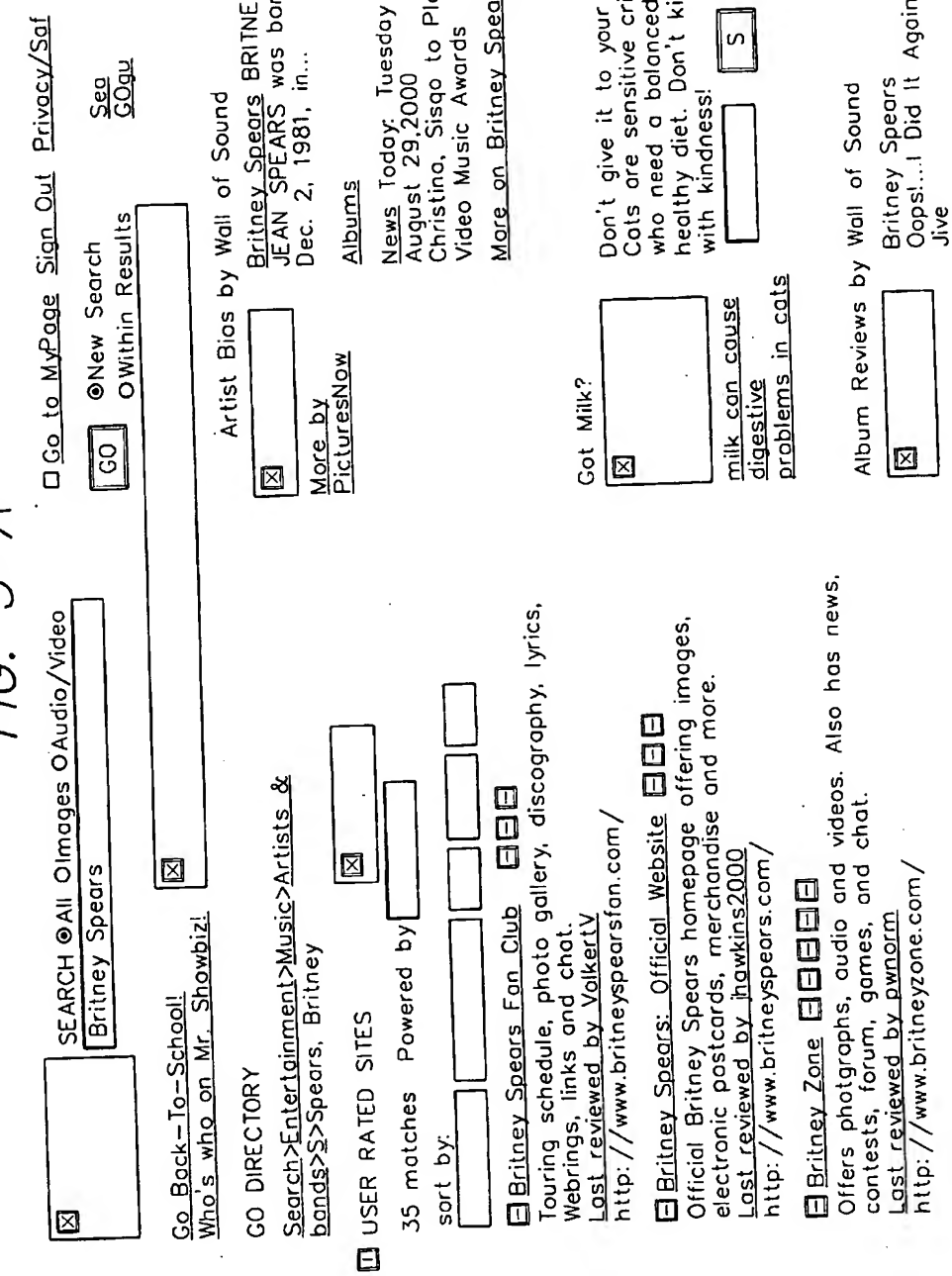

CONTAINS TOPIC NAMES, ALTERNATIVE TOPICS, KEYWORDS THAT DESCRIBE NAMES THAT ARE NOT EXACT MATCHES.
QUERY
KEYWORD SERVICE ?
DMT TOPICS
TOPIC NAMES
KEYWORDS
CHILD TOPIC NAMES
EXACT MATCH TABLE
YES
EXACT MATCH
NO
GOGUIDES INDEX
WEB PAGE TITLES AND SUMMARIES
XS DATABASE
YES
SINGLE MATCH
MULTIPLE MATCHES (REFINE SEARCH)
NO
THIRD PARTY CONTENT
NO MATCH

FIG. 2

FIG. 3-A


Go to MyPage Sign Out Privacy/Saf
SEARCH All Images Audio/Video
Britney Spears
GO
New Search
Within Results
Sea
GOgu
Go Back-To-School!
Who's who on Mr. Showbiz!
Artist Bios by Wall of Sound
Britney Spears BRITNEY
JEAN SPEARS was born
Dec. 2, 1981, in...
Albums
News Today, Tuesday
August 29,2000
Christina, Sisqo to Play
Video Music Awards
More on Britney Spears
GO DIRECTORY
Search>Entertainment>Music>Artists &
bands>S>Spears, Britney
More by
PicturesNow
USER RATED SITES
35 matches Powered by
sort by:
Britney Spears Fan Club
Touring schedule, photo gallery, discography, lyrics,
Webrings, links and chat.
Last reviewed by VolkertV
http://www.britneyspearsfan.com/
Britney Spears: Official Website
Official Britney Spears homepage offering images,
electronic postcards, merchandise and more.
Last reviewed by jhawkins2000
http://www.britneyspears.com/
Britney Zone
Offers photgraphs, audio and videos. Also has news,
contests, forum, games, and chat.
Last reviewed by pwnorm
http://www.britneyzone.com/
Got Milk?
Don't give it to your
Cats are sensitive critters
who need a balanced and
healthy diet. Don't kill
with kindness!
milk can cause
digestive
problems in cats
S
Album Reviews by Wall of Sound
Britney Spears
Oops!...I Did It Again
Jive

001Pic.com: Britney Spears
Offers pictures, audio and videos. Also has Britney puzzle games, screen saver, and britney web popularity info.
Last reviewed by jerryman44
http://www.001pic.com/BritneySpears/

Adorable Britney Spears
Britney Spears biography, discography, lyrics, pictures galleries and links to other Britney sites.
Last reviewed by sthenbelle05
http://www.britney-spears.nm.ru/

Next 10>

WEB SEARCH RESULTS

26,388 matches Powered by

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Britney Spears-Go there directly with this Internet Keyword by RealNames.

1. Peeps.com: Britney Spears
Official site has Britney's biography, photos, interview in audio or video, and fan club info.
Relevance 93% Date 28 Jul 1999, Size 1.6K
http://www.peeps.com/britney/
Find similior pages | More results | Translate this page

2. Britney Spears Organization
Stylish site pays tribute to Spears with a biography, a message board, a discography, a fan club, and more.
Relevance 92% Date 22 Oct 1999, Size 7.2K
http://www.britneyspears.org/
Find similior pages | Translate this page

3. Wall of Sound: Britney Spears
Biography, discongraphy, CD review and news.
Relevance 90% Date 6 Oct 1999, Size 15.4K
http://wallofsound.go.com/artists/britneyspears/h...
Find similior pages | Translate this page

The message here is not subtle nor hard to disconnect her...

Reg

Save up to 70%!
- Big Deal of the Day
- Electronics
- Bargaineers Club

Audio/Video from Listen.com
Britney Spears

Already a pop singer of fabled proportions teen queen of the marketing tie-in, Britney was groomed for pop st

GO Shopping

Shop for what you want!
- Search for britney spears
- Shop by Product
- Utilize the Buyer's Guides
- See Merchant Ratings
- Use GO Shopping's Advance Search

Look in GO S

FIG. 3-B

4. Britney Spears: The Official Britney Spears Website
The Official Britney Spears Website provides extensive information about the teen music sensation, from her southern belle upbringing in Louisiana, to her days as a chipper Mouseketeer and her current...
Relevance 87% Date 13 Aug 1999, Size 10.6K
http://www.officialbritney.com/
Find similiar pages | Translate this page

5. Britney Spears Fan.com
Touring schedule, photo gallery, discography, lyrics, Webrings, links and chat.
Relevance 86% Date 9 Sep 1999, Size 14.5K
http://www.britneyspearsfan.com/
Find similiar pages | Translate this page

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FIG. 3-C

05/29/2004, EAST Version: 1.4.1

FIG. 4

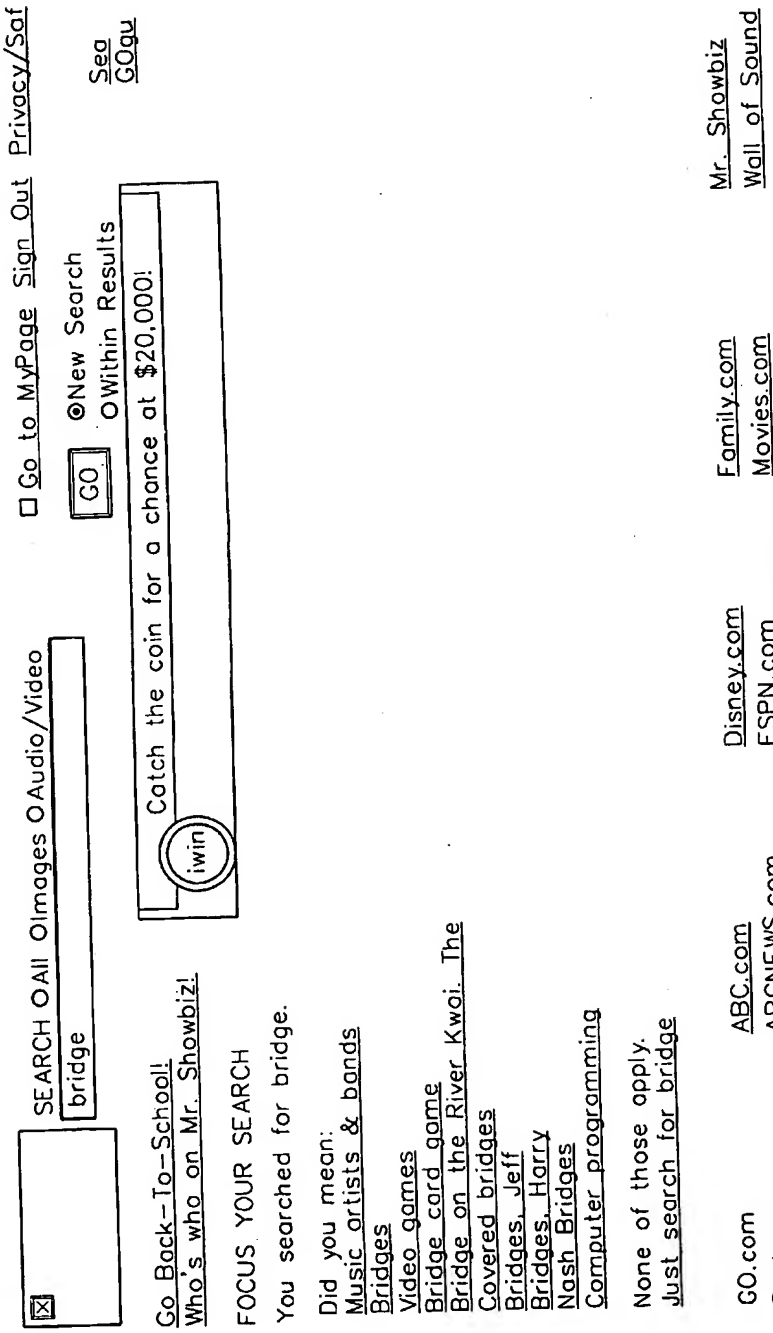
SEARCH All Images Audio/Video
bridge
GO
Go to MyPage Sign Out Privacy/Saf
New Search
Within Results
Sea
GOqu
Catch the coin for a chance at $20,000!
iwin
Go Back-To-School!
Who's who on Mr. Showbiz!
FOCUS YOUR SEARCH
You searched for bridge.
Did you mean:
Music artists & bands
Bridges
Video games
Bridge card game
Bridge on the River Kwai, The
Covered bridges
Bridges, Jeff
Bridges, Harry
Nash Bridges
Computer programming
None of those apply.
Just search for bridge
GO.com Partners:
ABC.com
ABCNEWS.com
Disney.com
ESPN.com
Family.com
Movies.com
Mr. Showbiz
Wall of Sound
GO.com Information: Add a URL About Our Company Jobs Write to Us
GO.com Affiliate Terms of Service
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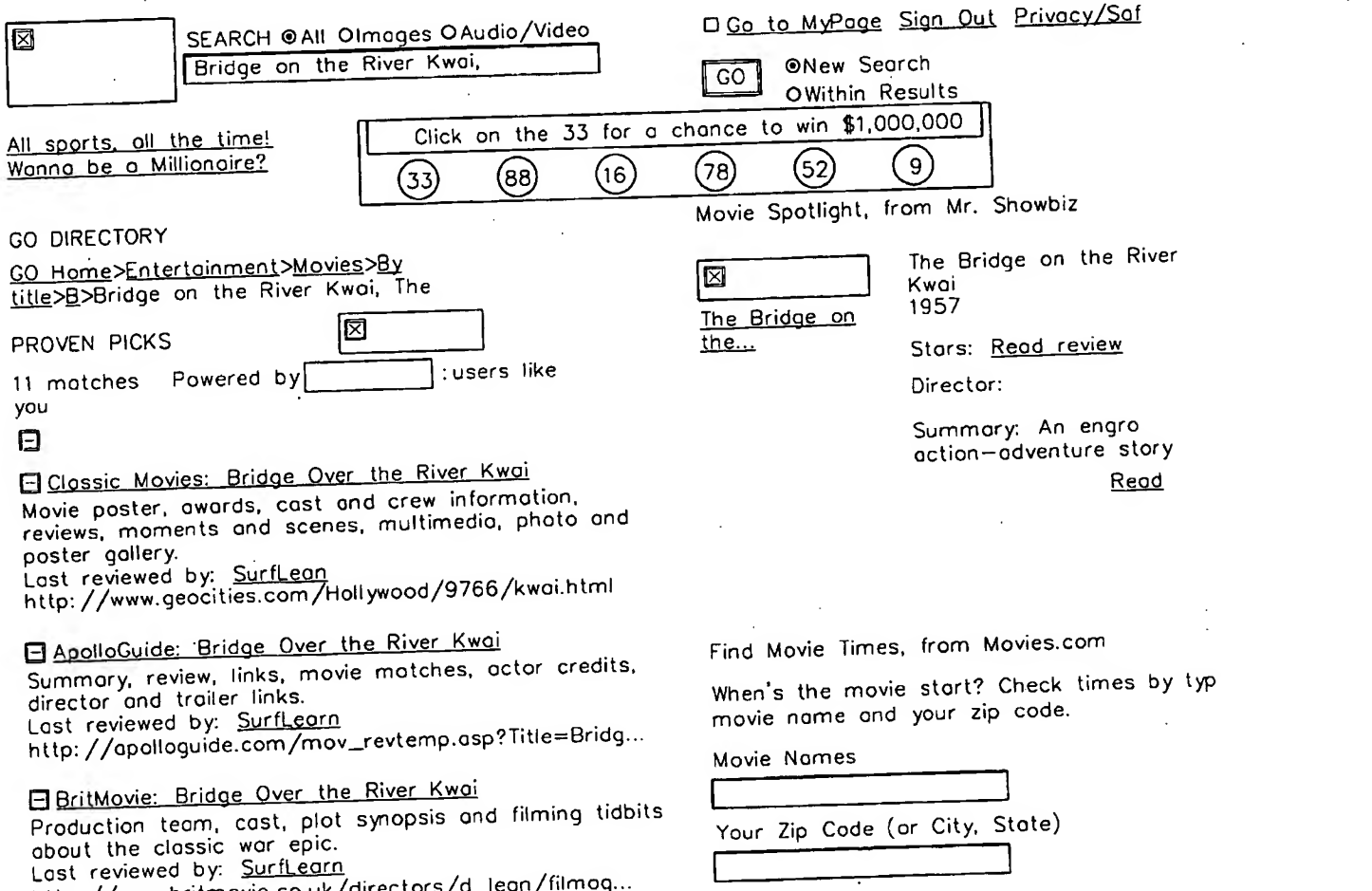
FIG. 5-A



05/29/2004, EAST Version: 1.4.1

FIG. 5-B

Hartwick.edu: Bridge Over the River Kwai
Film poster with Hartwick Classic Film Leadership Case study based on the film, which is based on Pierre Boulle's novel.
Last reviewed by: SurfLearn
http://www.hartwick.edu/hhmi/cases/riverkwai.htm

At-A-Glance: Bridge Over the River Kwai
Sam and Dean discuss aspects of the film and other reviews of it.
Last reviewed by: SurfLearn
http://www.rinkworks.com/movies/m/the.bridge.in.th...

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GO.com: Your Page for "Bridge on the River Kwai, The"

1. Farmington Library
Farmington Library
http://connect.crlc.org:1092/

2. The Flick Filosopher | The Bridge on the River Kwai
Instantly one of my favorite films, The Bridge on the River Kwai is a tense, terrifying, absolutely riveting film about the ironies of war and the deadly psychological games enemy...
http://www.flickfilosopher.com/oscars/bestpix/riv...

3. Bridge on the River Kwai Plot
One of "Bridge on the River Kwai" web pages. Part of

ebay

Summer Specials!
- Summer Necessities
- Great Getaways!
- Summer Blockbusters

See Movie Reviews by Mr. Showbiz
- Bring It On (PG-13)
Kirsten Dunst and Eliza Dushku have...
(77/100)
- The Art of War (R)
There's definitely no art to Wesley... (29/1
- The Crew (PG-13)
Geezer goombahs run amok in Miami's...
(36/100)

More Rev

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the 'History in Film' web site. Includes plot, outlines, worksheets and screen photos.
http://www.historyinfilm.com/kwai/plot.htm

4. The Bridge On The River Kwai (1957)
Memorable Moments from Great Movies! Great Moments and Scenes from Memorable Movies! Great Lines and Quotes from the Movies! Great Movies with Great Dialogue! Great Stars and Great Characters in Great...
http://www.filmsite.org/bridge.html

5. Bridge on the River Kwai, The
The Bridge on the River Kwai Mark R. Starting with The Bridge On the River Kwai, I will begin reviewing "oldies but goodies." As I work in a video store, I cringe when garbage new...
http://www.projectorbooth.com/reviews/rewind/brid...

Next 10>

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(33) (88) (16) (78) (52) (9)

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FIG. 5-C

FIG. 6-A

SEARCH ◉All OImages OAudio/Video
bridges
Go to MyPage Sign Out Privacy/Saf
GO
◉New Search
OWithin Results
Sea
GOqu
Go Back—To—School!
Who's who on Mr. Showbiz!
GO DIRECTORY
Search>Travel>Vacation ideas>Tourist attractions>Bridges
Bridges
Covered bridges
USER RATED SITES
6 matches Powered by
sort by:
Travel Vocations
Find the perfect getaway
• Beach vacations
• Find a Resort
• Disney World Vacations
• Bed & Breakfast Search
More vacations
Got Milk?
milk can cause digestive problems in cats
Don't give it to your Cats are sensitive critters who need a balanced and healthy diet. Don't kill with kindness!
S
Disney Vacations
• Disney Vacations Home
Bridges of Portland, Oregon
Photos and descriptions of the bridges that span the Columbia and Willamette rivers in Portland, Ore.
Last reviewed by traveler112
http://www.bizave.com/portland/bridges/
Golden Gate Bridges: San Francisco
History, photos and an FAQ about this historic San Francisco bridge.
Last reviewed by traveler112
http://www.goldengate.org/
Historic Bridges of Oregon
Site offers links to information and photographs of many of the state's historically significant bridges.
Last reviewed by traveler112
http://www.odot.state.or.us/eshtm/br.htm

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FIG. 6-B

Royal Gorge Bridge: Colorado
World's highest suspension bridge, spanning the Arkansas River at a height of 1,053 feet. Site includes photos, history and visitor information.
Last reviewed by traveler112
http://royalgorgebridge.com/

Good Bridge News
Information and local news coverage concerning the Ringling Causeway Bridge.
Last reviewed by jbrooks18
http://www.thegoodbridge.com/

Next 1>

WEB SEARCH RESULTS

703,234 matches Powered by:

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1. New Hampshire's Covered Bridges
Complete listing and brief descriptions of all 54 of NH's Covered Bridges.
Relevance 71% Date 9 Jul 1999, Size 9.1K
http://www.nhweb.com/travel_guide/covered_bridges...
Find similior pages | Translate this page

2. DOE Information Bridges
Full-text DOE research and development reports in physics, chemistry, materials, biology, environmental cleanup, energy technologies, and other topics.
Relevance 71% Date 5 Feb 1999, Size 1.1K
http://www.doe.gov/bridge/
Find similior pages | More results | Translate this page

3. Bridge World Home Page
Online home of Bridge World magazine. Includes an

- Walt Disney World Vacations
- Disneyland Vacation
- Disney Cruise Line Vacations
- Disney Theme Park

More Disney

Save up to 70%!
- Big Deal of the Day
- Electronics
- Bargaineers Club

Travel Reservations

- Air
  Book a flight
- Car
  Rent a car
- Hotel
  Reserve a hotel room.

Travel Destinations

Where are you going? Find country profiles first choosing a continent.

Africa

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introduction to the game, a practice area, and bridge references.
Relevance 71% Date 22 Apr 1999, Size 4.5K
http://www.bridgeworld.com/
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4. American Contract Bridge League
Features tournment info, locations of bridge clubs around the world, online bridge play, laws of duplicate bridge, sales catalog, and more.
Relevance 71% Date 4 Oct 1999, Size 8.5K
http://www.acbl.org/
Find similiar pages | More results | Translate this page

5. Bridge Webring
Links to bridge-related sites on the Internet.
Relevance 70% Date 3 Jan 1999, Size 5.8K
http://www3.ns.sympatico.ca/david.positronic/ring
Find similiar pages | Translate this page

Next 10>

Check Out the GO Shop

Travel Resources

- Plan trips with friends
- Get a map
- Buy travel essentials
- Translate a phrase
- Check the weather

Look in GO S

GO.com Partners: ABC.com | Disney.com | Family.com | Mr. Showbiz | ABCNEWS.com | ESPN.com | Movies.com | Wall of Sound

GO.com Information: Add a URL | About Our Company | Jobs | Write to Us | GO.com Affiliate | Terms of Service

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FIG. 6-C

05/29/2004, EAST Version: 1.4.1

FIG. 7-A

SEARCH ◉All OImages OAudio/Video
loza12
GO ◉New Search OWithin Results

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Heavenly music at the Wall of Sound!

And if you can't play, ahead and listen! Check some of these great artists.

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- Blaine loves Led Zeplin
- Goo Goo Dolls- overhyped, but still
- Our own Kristina's from Nine Inch Nails
- Aussie soap opera song Natalie Imbruglia

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FIG. 7-B

FIG. 8

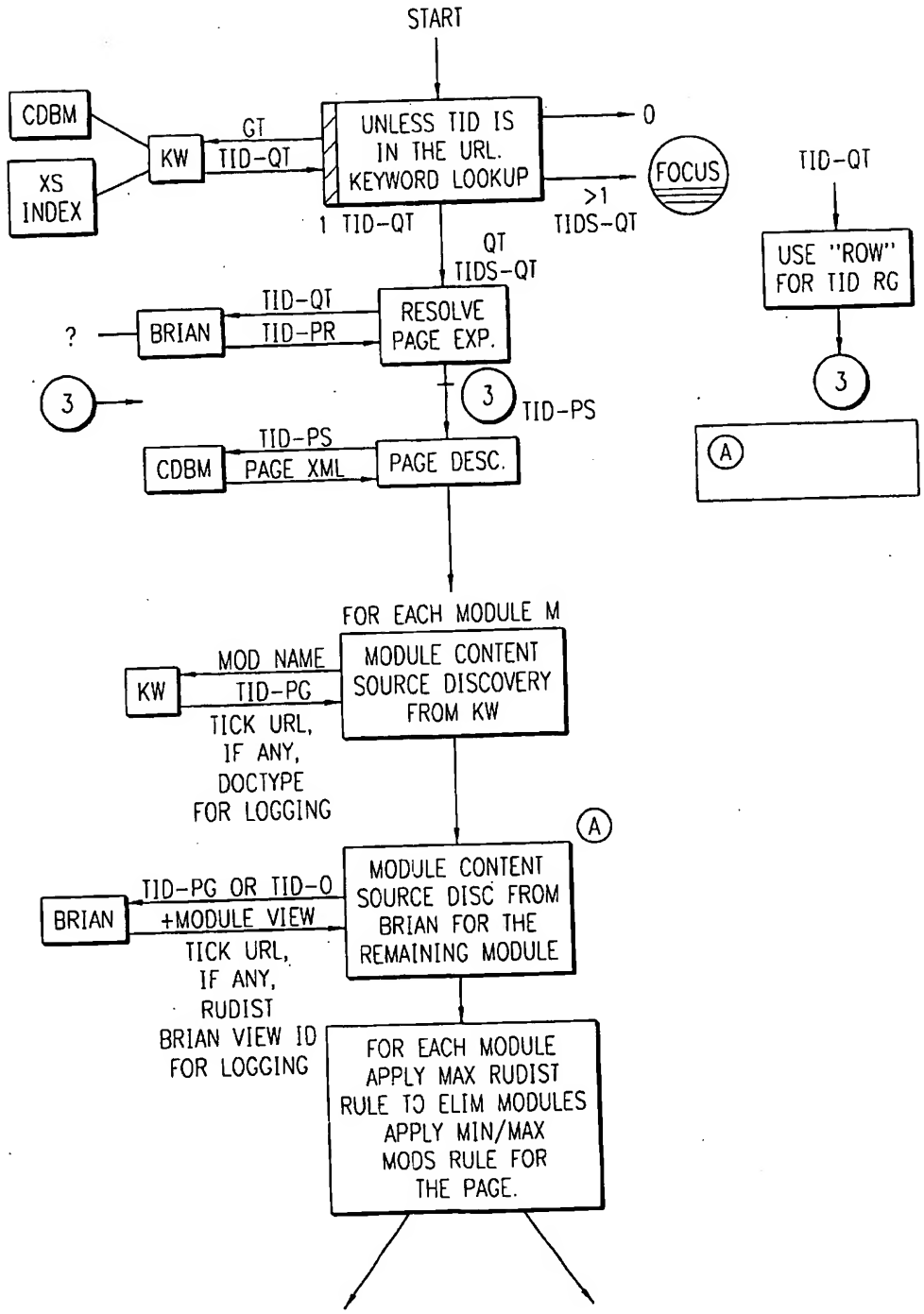
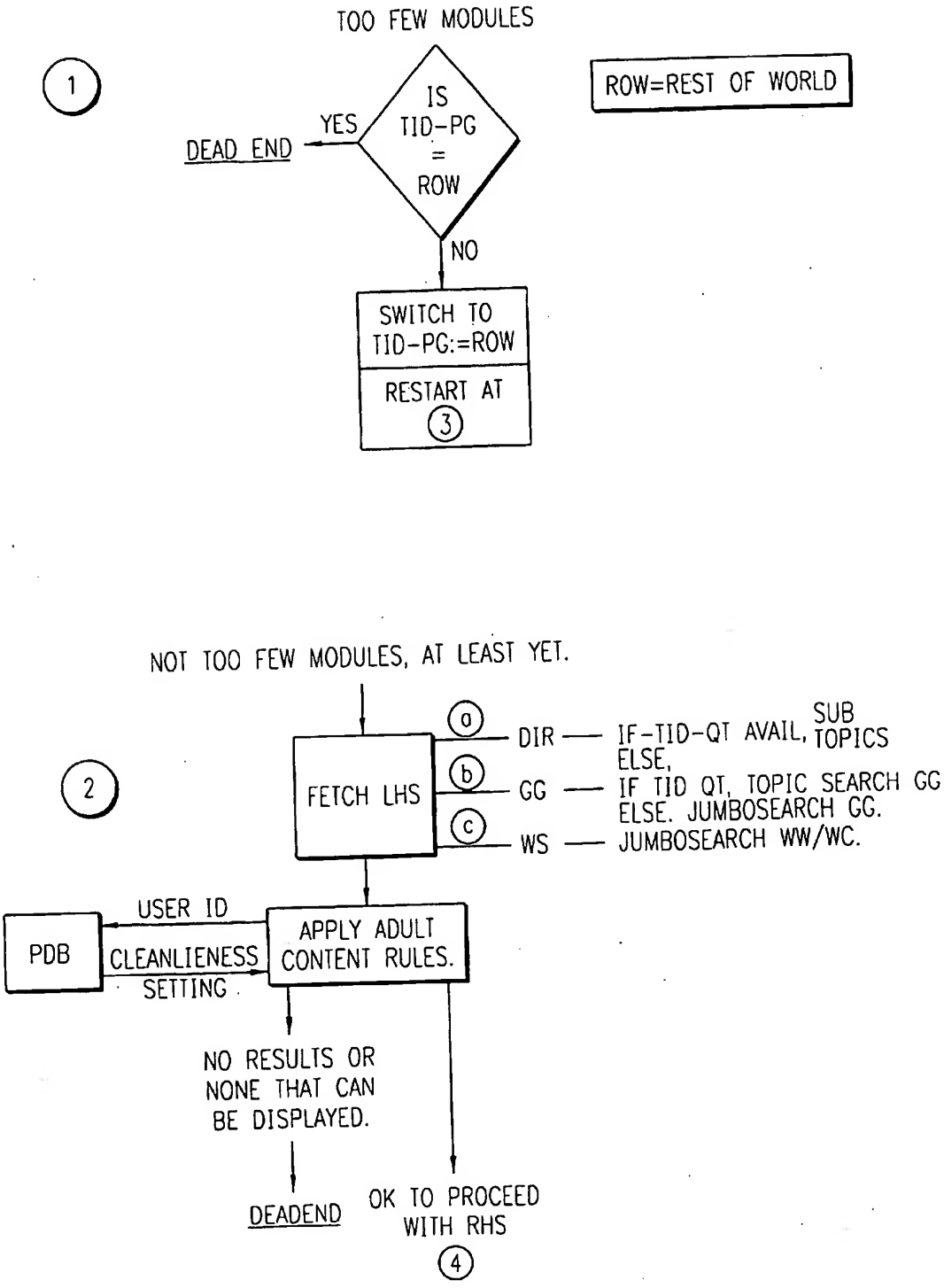

START
CDBM
XS INDEX
KW
GT
TID-QT
UNLESS TID IS IN THE URL. KEYWORD LOOKUP
0
FOCUS
>1 TIDS-QT
1 TID-QT
QT TIDS-QT
TID-QT
USE "ROW" FOR TID RG
3
A
?
BRIAN
TID-QT
TID-PR
RESOLVE PAGE EXP.
3
TID-PS
CDBM
TID-PS
PAGE XML
PAGE DESC.
FOR EACH MODULE M
KW
MOD NAME
TID-PG
MODULE CONTENT SOURCE DISCOVERY FROM KW
TICK URL, IF ANY, DOCTYPE FOR LOGGING
A
BRIAN
TID-PG OR TID-0
+MODULE VIEW
MODULE CONTENT SOURCE DISC FROM BRIAN FOR THE REMAINING MODULE
TICK URL, IF ANY, RUDIST BRIAN VIEW ID FOR LOGGING
FOR EACH MODULE APPLY MAX RUDIST RULE TO ELIM MODULES APPLY MIN/MAX MODS RULE FOR THE PAGE.

FIG. 9


TOO FEW MODULES
1
IS TID-PG = ROW
YES
DEAD END
NO
SWITCH TO TID-PG:=ROW
RESTART AT 3
ROW=REST OF WORLD
NOT TOO FEW MODULES, AT LEAST YET.
2
FETCH LHS
a
DIR — IF-TID-QT AVAIL, SUB TOPICS ELSE,
b
GG — IF TID QT, TOPIC SEARCH GG ELSE. JUMBOSEARCH GG.
c
WS — JUMBOSEARCH WW/WC.
PDB
USER ID
CLEANLIENESS SETTING
APPLY ADULT CONTENT RULES.
NO RESULTS OR NONE THAT CAN BE DISPLAYED.
DEADEND
OK TO PROCEED WITH RHS
4

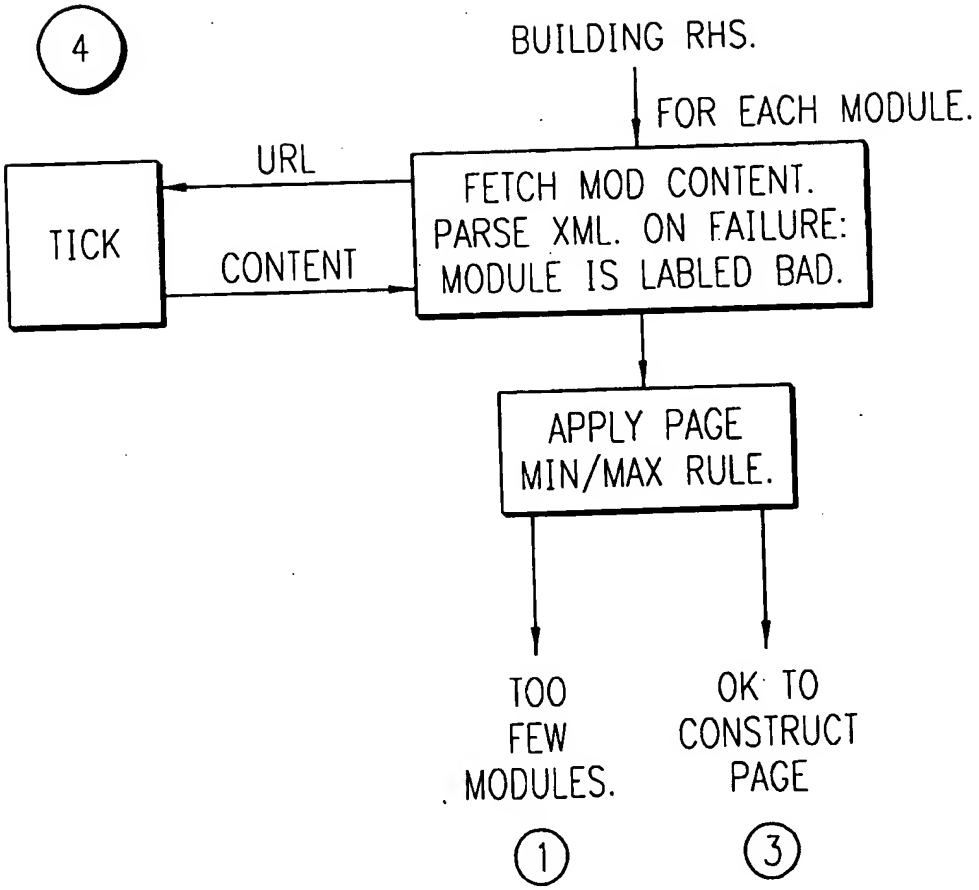

4
BUILDING RHS.
FOR EACH MODULE.
URL
CONTENT
TICK
FETCH MOD CONTENT.
PARSE XML. ON FAILURE:
MODULE IS LABLED BAD.
APPLY PAGE
MIN/MAX RULE.
TOO
FEW
MODULES.
OK TO
CONSTRUCT
PAGE
1
3

FIG. 10

FIG. 11

DEADEND CAUSE DEPENDENT:

a) LHS RELATED WARNINGS–SHOW APPROPRIATE ERROR PAGE
eg. ADULT, 500 HITS, NO GT,
NO RESULTS IN NEITHER AH OR WS

b) TOO FEW MODULES–SHOW ONLY LHS PAGE.

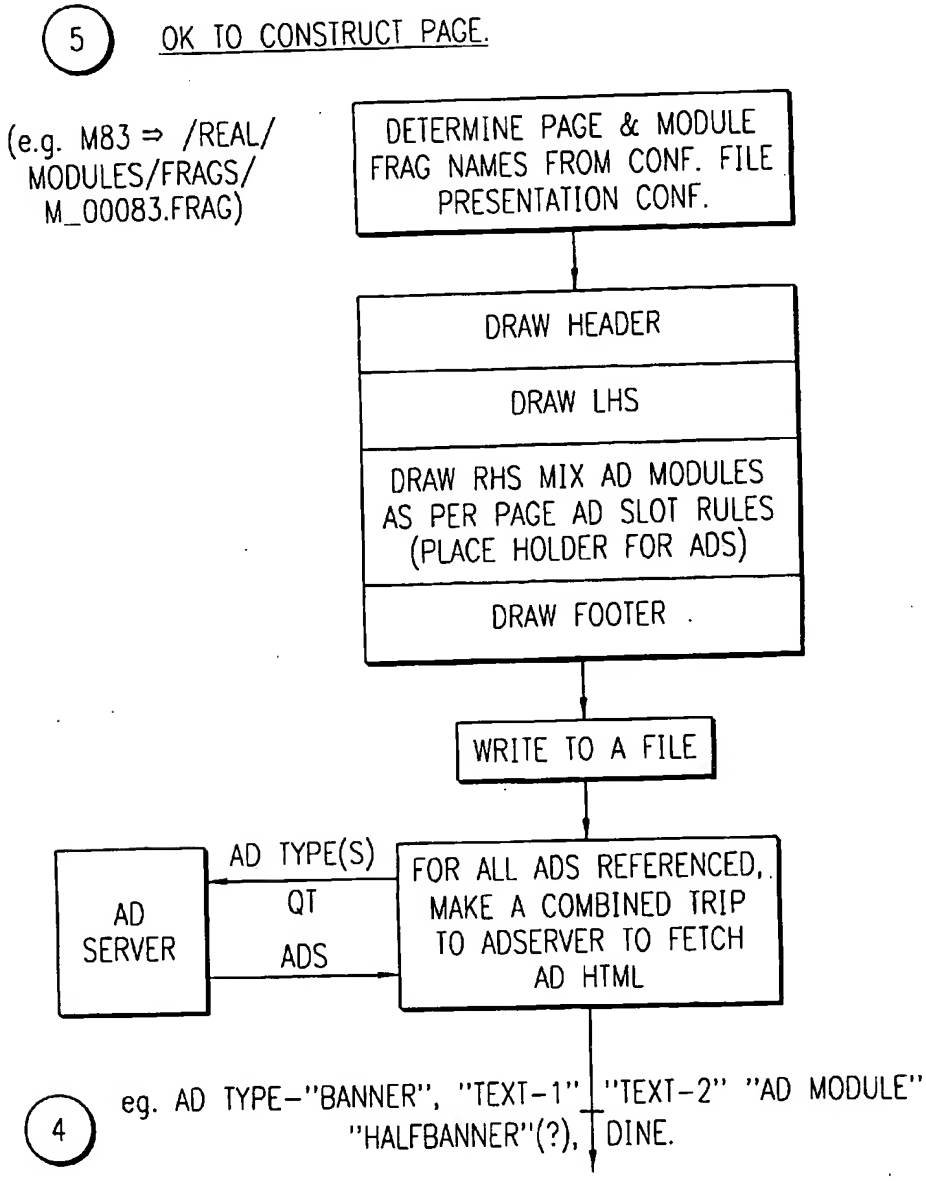


FIG. 12

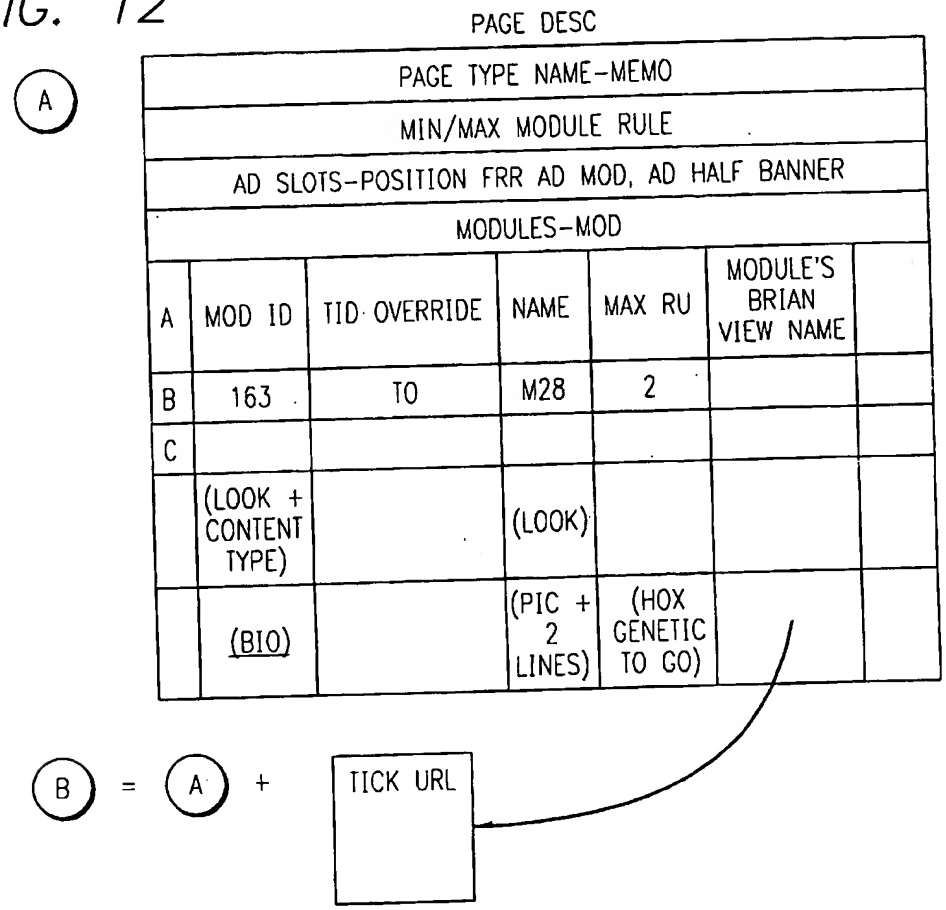

PAGE DESC
A
PAGE TYPE NAME-MEMO
MIN/MAX MODULE RULE
AD SLOTS-POSITION FRR AD MOD, AD HALF BANNER
MODULES-MOD
A
MOD ID
TID OVERRIDE
NAME
MAX RU
MODULE'S BRIAN VIEW NAME
B
163
TO
M28
2
C
(LOOK + CONTENT TYPE)
(LOOK)
(BIO)
(PIC + 2 LINES)
(HOX GENETIC TO GO)
B = A +
TICK URL

FIG. 13

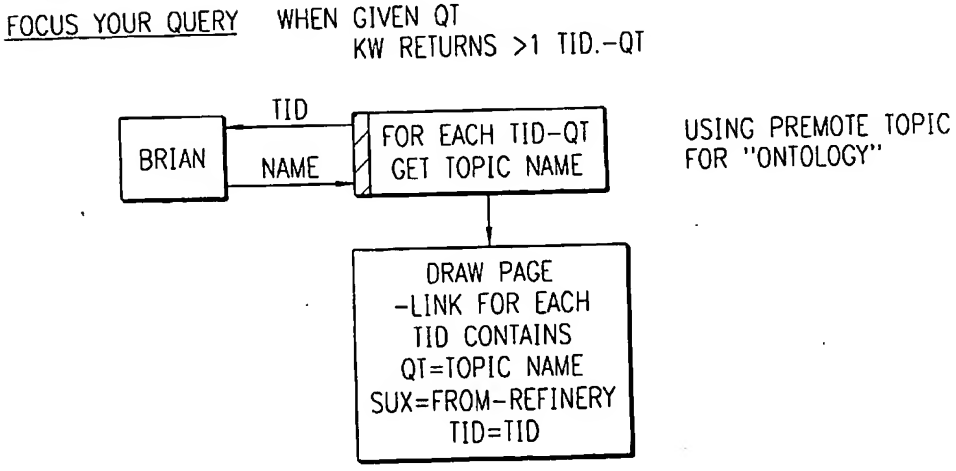

FOCUS YOUR QUERY
WHEN GIVEN QT
KW RETURNS >1 TID.-QT
TID
BRIAN
NAME
FOR EACH TID-QT GET TOPIC NAME
USING PREMOTE TOPIC FOR "ONTOLOGY"
DRAW PAGE
-LINK FOR EACH TID CONTAINS QT=TOPIC NAME SUX=FROM-REFINERY TID=TID

FIG. 14

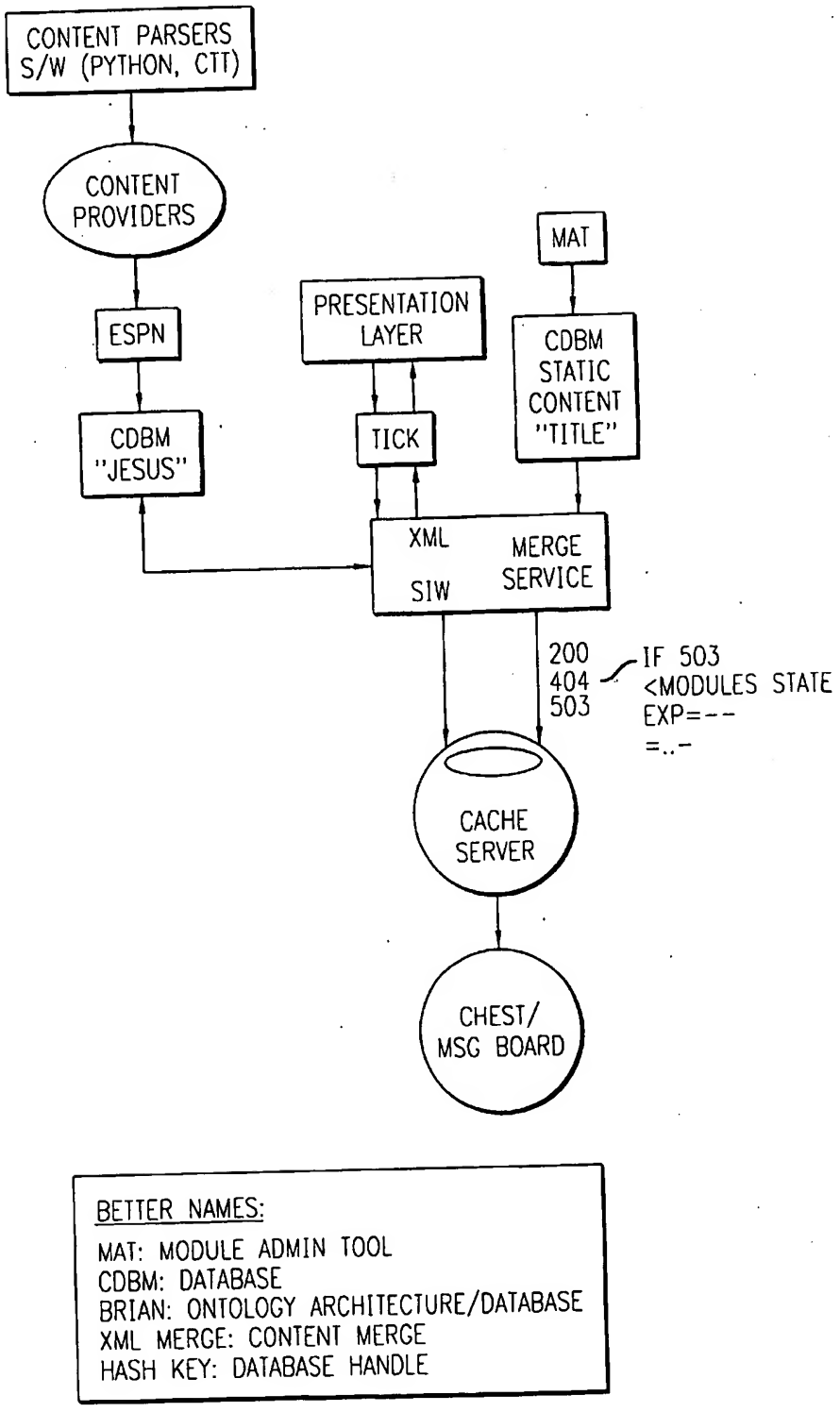

CONTENT PARSERS S/W (PYTHON, CTT)
CONTENT PROVIDERS
ESPN
CDBM "JESUS"
PRESENTATION LAYER
TICK
MAT
CDBM STATIC CONTENT "TITLE"
XML SIW
MERGE SERVICE
200
404
503
IF 503
<MODULES STATE
EXP=--
=..-
CACHE SERVER
CHEST/ MSG BOARD
BETTER NAMES:
MAT: MODULE ADMIN TOOL
CDBM: DATABASE
BRIAN: ONTOLOGY ARCHITECTURE/DATABASE
XML MERGE: CONTENT MERGE
HASH KEY: DATABASE HANDLE

FIG. 15

BETTER NAMES:

DMT ——► DIRECTORY MANAGEMENT TOPIC
BRIAN ——► CODE NAME FOR ONTOLOGY DB/ARCHITETURE
MAT ——► MODULE ADMISTRATION TOOL
CDGM ——► FASTER LOOKUP DATABASE
KEYWORD ——► MAPPING USER QUERY TO UNIQUE WORD(S)
SP ——► SERVICE PROVIDER CONTENT PARSER OF CONTENT TO XML
TID ——► TOPIC ID
QT ——► USER TYPED TEXT
KW ——► KEYWORD SERVICE
ROW ——► REST OF THE WORLD
RDIST ——► DISTANCE IN THE ONTOLOGY TREE TO FIND CONTENT
PDB ——► PERSONALIZATION DATA BASE
TICK ——► TRANFERING INFORMATION
    ⓐ CHEAPLY AND KWICKLY
    ⓑ (CONTET CACHEING SERVER)
MERGE ——► CONTENTMERGE OF DIFFERENT XML TEMPLATED CONTENT.
LHS ——► LEFT HAND SIDE
RHS ——► RIGHT HAND SIDE
MODULE ——► A UNIT OF HTML PRESENTATION.
XS ——► EXTENDED KEYWORD SERVICE. (ALTERNATIVE LOOKUP TABLE)

SYSTEM AND METHOD FOR SELECTING CONTENT FOR DISPLAYING OVER THE INTERNET BASED UPON SOME USER INPUT

RELATED APPLICATIONS

This application is based on U.S. Provisional Patent Application No. 60/229,779; filed Sep. 1, 2000 and entitled "Method and System for Displaying Content Over the Internet."The contents of which are incorporated herein.

BACKGROUND OF THE INVENTION

1. Field of Invention

This invention relates generally to a system and method for selecting content for displaying over the Internet based upon some user input. Particularly, this invention relates to a system and method of selecting content from a content directory for display in a web-page where the content is based upon some arbitrary user input.

2. Background of the Invention

In recent years, web-pages, and other Internet components have changed to incorporate the popularity of customizable, interactive, and dynamic structure. Most existing web-pages contain pre-specified content, where a user simply downloads the source code of the desired page for viewing in an Internet browser. Some web-pages may have limited dynamic components and may offer limited customizability. For example, existing web pages may allow a user to make certain custom settings to a web-page. However, the user is usually prompted for specific information, and has a limited number of choices. A need still exists for a system and method capable of generating and displaying content in a web-page, based upon some arbitrary input by a user.

3. Summary of the Invention

The invention disclosed herein is a novel approach which addresses many of these limitations. A general feature of the present invention is to provide a system and method for displaying content over the Internet, based upon some arbitrary user input. The content may include, but is not limited to web content such as pictures and/or links and/or functional programs and/or tables and/or charts and/or functions etc.

The present invention provides a method for displaying information from the Internet. In one embodiment, the invention generates a plurality of content modules, each content module comprising a subset of the content of at least one web site. The content modules are then stored in a content module data directory. When a query is received from a user, the query is assigned to at least one content module. The results of the query are displayed on two regions of the user's screen. On a first region of the user's display screen a list of information relating to the plurality of retrieved web sites is displayed. On a second region of said display screen, information from said at least one content module associated with the query is displayed.

One feature of the present invention is to maintain a directory of web-page content modules and to algorithmically traverse the directory, based upon some user input, to synthesize content for a web-page.

A module as used herein may be a discrete chunk of content so that combining one or multiple modules will in effect synthesize part or all of the content of a web page. For example, a user may issue as input the word "dolphins" and the invention will dynamically create a web page with various content modules related to dolphins. The exemplary method of the invention may traverse the directory containing the content modules and obtain modules which exactly correspond to the keyword "dolphins" if such modules exist in the directory. For example, the traversal may obtain content modules with pictures and links to dolphin shows. Alternatively the invention may obtain modules that do not directly correspond to the keyword "dolphins," but are related to keyword, if such modules exist in the directory. For example, the directory traversal may obtain content modules related to marine mammals.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an exemplary method diagram in accordance with one embodiment of the present invention, which illustrates by way of example a flow chart that represents a functional algorithm for generating content for display over the Internet based upon some user input.

FIG. **2** is an exemplary method diagram in accordance with one embodiment of the present invention, which illustrates by way of example a flow chart that represents a functional algorithm for generating identification numbers for associating with nodes in a data directory.

FIG. **3** discloses a possible resulting web page from user input of "Britney Spears".

FIG. **4** discloses a possible resulting web page from user input of "bridge".

FIG. **5** discloses a possible resulting web page from a user selection of "Bridge on the River Kwai, The".

FIG. **6** discloses a possible resulting web page from a input of "bridges".

FIG. **7** discloses a possible resulting web page from a user input of "loza12".

FIG. **8** discloses part of the embodiment represented by FIG. **1**; namely a detailed description of the communication channels 1–17.

FIG. **9** discloses part of the embodiment represented by FIG. **1**; namely, scenarios of the traversal of the data structure **14**.

FIG. **10** discloses part of the embodiment represented by FIG. **1**; namely obtaining content from each node during the traversal **14**.

FIG. **11** discloses part of the embodiment represented by FIG. **1**; namely additional checks after the content is retrieved **20**.

FIG. **12** discloses the format of the page description.

FIG. **13** discloses part of the embodiment represented by FIG. **1**; namely the interstitial page **12**.

FIG. **14** discloses part of the embodiment represented by FIG. **1**; namely the data structure **14**.

FIG. **15** is a list of acronyms referenced by FIGS. **8–14**.

DETAILED DESCRIPTION OF THE INVENTION

This description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating the general principles of the invention. The section titles and overall organization of the present detailed description are for the purpose of convenience only and are not intended to limit the present invention. Accordingly, the invention will be described with respect to a ontology content directory data structure which is a data tree. It is to be understood that the particular data structure described for the ontology directory herein is for illustration only; the invention also applies to other data structures and combinations of other data struc-

tures. For example, linked lists, heaps, deaps, hash tables, directories etc. Also, the invention may apply to numerous types of each of these data structures, such as binary search trees, 2–3 trees, 2–3–4 trees, red-black trees, m-way search trees, b-trees, digital search trees, k-dimensional trees, min-max heaps, binomial heaps, f-heaps, etc., individually and/or collectively.

The invention may also be run on multiple computer hardware and software platforms. For example, Intel/AMD based systems, Sun Microsystems, Silicon Graphics, IBM RS/6000, IBM AS/400, Macintosh, Windows, Unix, etc. The invention may also encompass various internet technologies such as Java applets, active servers, xml, html, dynamic html, Active X, Java script, etc. The invention may be written in a number of computer languages, such as, C/C++, Java, Perl, Java script, Lisp, Visual Basics, etc., individually or collectively. The resulting web page may be viewed on various browsers such as Netscape Navigator, Internet Explorer, and/or various document editors such as Microsoft Word, Word Perfect etc.

Displaying Content Over the Internet Based Upon Some User Input

FIG. **1** illustrates by way of example a flow chart that represents a functional algorithm for generating content for display over the Internet based upon some user input. In this embodiment of the present invention, a user on a client system first sends a query to a server system (**1**). This query may be any textual input and/or keyword and/or phrase and/or search term etc.

Generating a Subject Category Identifier

The query is then algorithmically associated with a subject category identifier (shown in steps **1–12**). In general, there may be four possible outcomes of the first pass of the algorithm: first, a single subject category identifier is obtained which is an exact match to the user input (**15**); second, a single subject category identifier is obtained which is an alternative match to the user input (**17**); third, multiple subject category identifiers are obtained which are alternative matches to the user input and the algorithm narrows the subject category identifiers to one (**16**); fourth no subject category identifier is found (**7**). FIG. **2** discloses another embodiment of generating the subject category identifiers (**15, 16, 17, 7** on FIG. **1**).

Subject category identifiers associated with user input may be stored in two different tables; namely, an exact match table (**3**) or an alternative table (**6**). First, the algorithm checks the exact match table (**2, 3**) to determine if there is a subject category identifier that corresponds to the query. The subject category identifiers in the exact match table correspond to nodes in the content module data directory (**13**) directly relating to the user input. For example, if the user input is "dolphins" and the algorithm obtains a subject category identifier in the exact match table (**3**), the respective node in the data directory (**13**) associated with that subject category identifier may contain a content module directly relating to dolphins. Furthermore a subject category identifier obtained from the exact match table (**3**) may indicate the starting node point for traversing the content module directory (**14**) and determine the algorithm for traversing the data directory for additional content modules. If no corresponding subject category identifier is found in the exact match table for some user input (**4**), the algorithm checks the alternative table to determine a subject category identifier that corresponds to the query (**5, 6**). If a single subject category identifier in the alternative table is found associated with the user input (**9, 10, 17**), then this subject category identifier is used for the directory traversal for obtaining content modules (**14**). The subject category identifiers in the alternative match table correspond to nodes in the content module data directory (**13**) relating to the user input and may indicate the starting node point for traversing the content module directory (**14**) and determine the algorithm for traversing the data directory for additional content modules. If a plurality of subject category identifiers are found (**9, 10, 11**) associated with the user input the algorithm may provide the user a choice of different query options to narrow the subject category identifiers to one (**12**). After the user makes a selection from the given choices, the algorithm selects the single subject category identifier (**16**). It is also possible that the algorithm not find a subject category identifier (**7, 8**) in either the exact match table or the alternative match table. In this case, the directory of content modules is not traversed.

Directory of Content Modules

A directory of content is maintained on the server system in a data structure such as a data tree which can be traversed (**13**). The content information may be stored in a variety of data structures known to one skilled in the art or methods developed in the future. An algorithmic traversal is then performed on the data structure based upon the subject category identifier generated from the query (**14**), in order to determine content for displaying (**20**). The data structure may be a data tree wherein each tree node contains pointer(s) to web content modules and each node is associated with a subject category identifier. The data tree may be hierarchically arranged so that the specificity of the web content module referenced by the node is a subset of the more general web content module referenced by the parent node. As an example, a node, associated with a subject category identifier, may be associated with mammals, and may contain a pointer to a web content module relating to mammals. The children node(s) of that node, also associated with subject category identifiers, may be associated with particular mammals, and may contain pointers to web content modules relating to those specific mammals such as dolphins or elephants. The children node(s) of the dolphin, for example, also associated with a subject category identifier, may be associated with a particular type of dolphin and may contain a pointer to a web content module relating to that particular type of dolphin. This type of data arrangement is just one method of maintaining the web content module directory. The data structure can be a collection of multiple data structures, and these data structures can be separated and/or merged. An arbitrary number of web content modules can be used in order to collectively provide content for a web page. The traversal may start at a particular node, wherein the node's number is equal to the subject category identifier generated from the query. The traversal may move up or down the data directory, depending upon how the subject category identifier was generated (**15, 16, 17**), in order to obtain content modules related to the query. For example, if the user input "dolphins" generated a subject category identifier from the exact match table (**15**), the algorithm may first use the content module referenced by the node corresponding to that subject category identifier, and then traverse down the data tree to obtain more specific content modules. If, on the other hand, the user input "dolphins" generated a subject category identifier from the alternative match table (**16** or **17**), the algorithm may first use the content module referenced by the node corresponding to that subject category identifier, and then traverse up the tree to obtain more general content modules. The web page is finally synthesized with the content modules obtained in the process outlined by FIG. **1**.

FIG. 2 is an exemplary method diagram in accordance with one embodiment of the present invention, which illustrates by way of example a flow chart that represents a functional algorithm for generating identification numbers for associating with nodes in a data directory.

FIG. 3 discloses the resulting web page from a subject category identifier obtained from the exact match table (15) from a query for "Britney Spears". FIG. 4 discloses the resulting web page from multiple subject category identifiers obtained (11) from the alternative match table from a query for "bridge" wherein no content modules are obtained and the user is given a choice of different query options (12). FIG. 5 discloses the resulting web page from a subject category identifier obtained (16) after the user selects "Bridge on the River Kwai, The" from the interstitial page (12) represented by FIG. 4. FIG. 6 discloses the resulting web page from a single subject category identifier obtained from the alternative match table (17) from a query for "bridges". FIG. 7 discloses the resulting web page from no match (7, 8) from a query for "loza12". FIGS. 8–14 disclose additional details of processes for implementing the embodiment of the invention shown in FIG. 1.

What is claimed is:

1. A method for displaying information comprising:

generating a plurality of content modules, each content module comprising a subset of the content of a web site;

storing the content modules in a content module data directory;

maintaining a database of subject category identifiers, each subject category identifier corresponding to at least one content module in the content module data directory; wherein the database of subject category identifiers comprises at least an exact match table and an alternative match table;

receiving a query from a user;

retrieving a plurality of URL's of web sites containing content pertaining to the query;

matching the query to at least one subject category identifier; the matching step comprising the step of determining that an exact match exists between the query and a subject category identifier in the exact match table;

obtaining at least one content module from the content module directory associated with the subject category identifier; and

displaying information relating to the plurality of retrieved web sites and information from said plurality of content modules on a display screen.

2. A method for displaying information comprising:

generating a plurality of content modules, each content module comprising a subset of the content of a web site;

storing the content modules in a content module data directory;

maintaining a database of subject category identifiers, each subject category identifier corresponding to at least one content module in the content module data directory, wherein the database of subject category identifiers comprises at least an exact match table and an alternative match table;

receiving a query from a user;

retrieving a plurality of TJRL's of web sites containing content pertaining to the query;

matching the query to at least one subject category identifier; the matching step determining that no exact match exists between the query and a subject category identifier in the exact match table and further determining that a match exists in an alternative match table which associates each user input with at least one key;

obtaining the at least one content modules from the content module directory associated with the subject category identifier; and

displaying information relating to the plurality of retrieved web sites and information from said plurality of content modules on a display screen.

3. A method according to claim 2, wherein subject category identifiers in the alternative match table determine an algorithm for identifying content modules in the content module directory associated with the query.

4. A method according to claim 2 wherein if the alternative match table cannot associate a query with a single subject category identifier, then providing the user with a plurality of choices such that the selection of one of said choices serves to permit the alternative match table to associate the user input with a single subject category identifier.

5. A method for displaying information comprising:

generating a plurality of content modules, each content module comprising a subset of the content of a web site;

storing the content modules in a content module data directory

maintaining a database of subject category identifiers, each subject category identifier corresponding to at least one content module in the content module data directory, wherein the database of subject category identifiers comprises at least an exact match table and an alternative match table;

receiving a query from a user;

retrieving a plurality of URL's of web sites containing content pertaining to the query;

matching the query to at least one subject category identifier;

obtaining the at least one content module from the content module directory associated with the subject category identifier;

traversing the content directory, wherein the subject category identifier specifies a particular algorithm used to traverse the content module directory; and

displaying information relating to the plurality of retrieved web sites and information from said plurality of content modules on a display screen.

6. A method for displaying information comprising:

generating a plurality of content modules, each content module comprising a subset of the content of a web site;

storing the content modules in a content module data directory;

maintaining a database of subject category identifiers, each subject category identifier corresponding to at least one content module in the content module data directory, wherein the database of subject category identifiers comprises at least an exact match table and an alternative match table;

receiving a query from a user;

retrieving a plurality of URL's of web sites containing content pertaining to the query;

matching the query to at least one subject category identifier;

obtaining the at least one content modules from the content module directory associated with the subject category identifier; and

displaying information relating to the plurality of retrieved web sites and information from said at least one content module on a display screen to the user.

7. A method according to claim 6, wherein said information is displayed on the first and second regions of the display screen in response to a single input from the user.

8. A method according to claim 6 wherein the content module directory comprises a data stricture having nodes, and wherein each node is associated with one or more subject category identifiers.

* * * * *

US006393427B1

(12) **United States Patent**
Vu et al.

(10) **Patent No.: US 6,393,427 B1**
(45) **Date of Patent: May 21, 2002**

(54) **PERSONALIZED NAVIGATION TREES**

(75) Inventors: **Quoc Vu**, San Jose; **Wen-Syan Li**, Fremont; **Edward Chang**, Santa Clara, all of CA (US)

(73) Assignee: **NEC USA, Inc.**, Princeton, NJ (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/274,814**

(22) Filed: **Mar. 22, 1999**

(51) **Int. Cl.**[7] **G06F 17/30**

(52) **U.S. Cl.** **707/101**; 707/100; 707/102; 707/103; 707/104

(58) **Field of Search** 707/101, 3, 5, 707/6, 7, 10, 100, 102, 103; 706/45; 345/356, 357; 709/217, 218

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(57) **ABSTRACT**

A method for constructing and maintaining a navigation tree based on external document classifiers is provided. In one embodiment, based on the returned category labels from the classifiers, a navigation tree is constructed by taking usability and user preferences into consideration. Control parameters and algorithms are provided for inserting into and deleting documents from the navigation tree, and for splitting and merging nodes of the navigation tree, are provided.

20 Claims, 10 Drawing Sheets

```
InsertDoc(Node N, Document D)
 if ( N.N is empty OR |D.C| = N.d ) then AddDoc(N, D)
 else
   j = N.d + 1
   find {N_i ∈ N.N|N_i.l = D.C_j}
   if ( found such N_i ) then InsertDoc(N_i,D)
   else AddDoc(N, D)
AddDoc(Node N, Document D)
   N.L = N.L ∪ {D}
   if ( N.δ ≥ α + δ_split) then Split(N)
```

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FIG. 1

Comparisons of Various Types of Classification Trees and Navigation Trees

Computers and Internet: Internet: World Wide Web: Databases and Searching: Web Directories
Computers and Internet: Software: Databases: Web Directories
Computers and Internet: Software: Reviews: Titles: Internet: Web Authoring Tools: Database Tools
Computers and Internet: Internet: World Wide Web: Databases and Searching
Regional: Countries: Canada: Computers and Internet: Internet: World Wide Web: Databases and Searching
Regional: Countries: New Zealand: Computers and Internet: Internet: World Wide Web: Databases and Searching
Regional: Countries: Australia: Computers and Internet: Internet: World Wide Web: Databases and Searching

FIG. 3

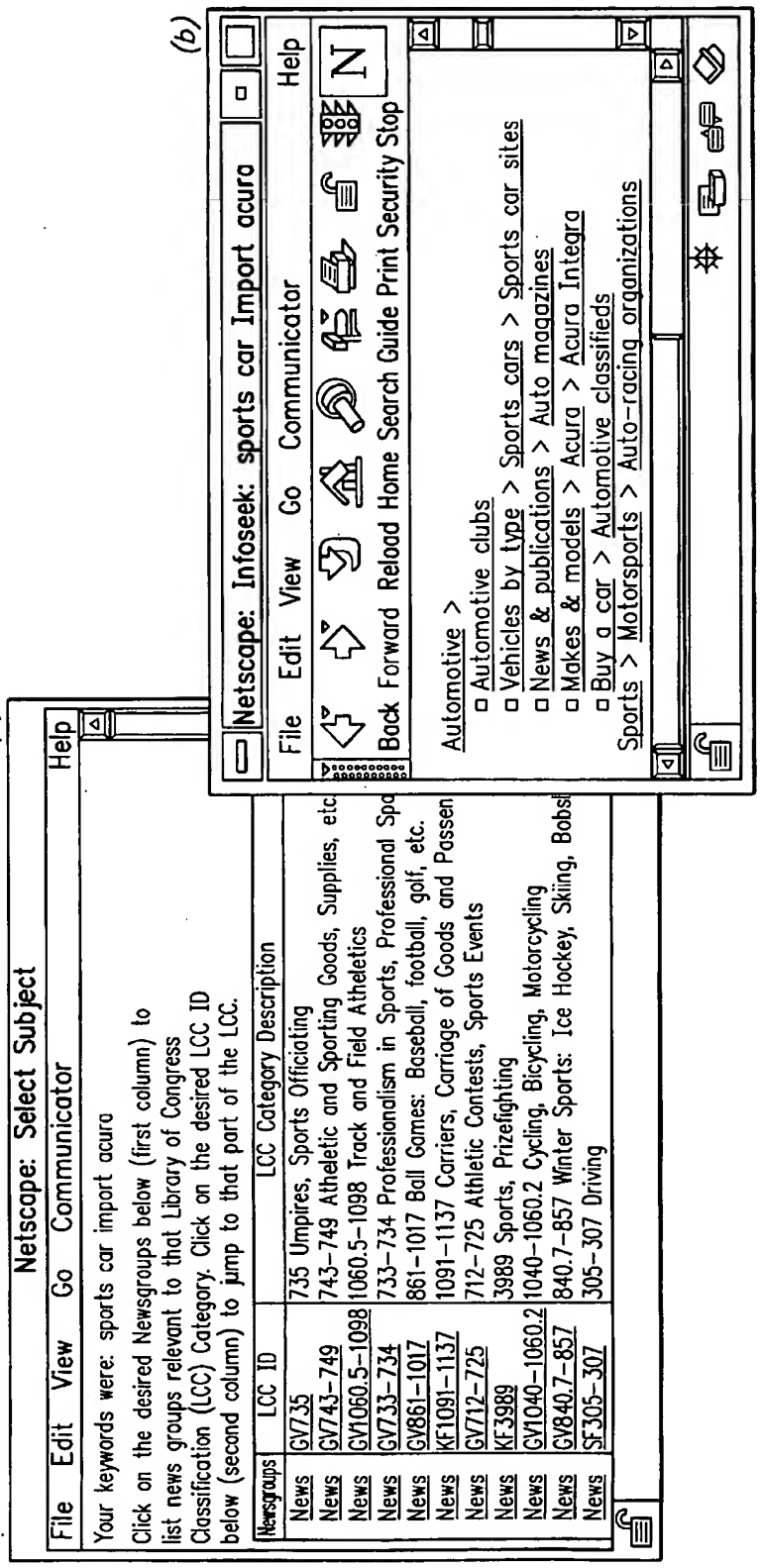
(a)
Netscape: Select Subject
File Edit View Go Communicator Help
Your keywords were: sports car import acura
Click on the desired Newsgroups below (first column) to list news groups relevant to that Library of Congress Classification (LCC) Category. Click on the desired LCC ID below (second column) to jump to that part of the LCC.
Newsgroups
LCC ID
LCC Category Description
News GV735 735 Umpires, Sports Officiating
News GV743-749 743-749 Athletic and Sporting Goods, Supplies, etc
News GV1060.5-1098 1060.5-1098 Track and Field Atheletics
News GV733-734 733-734 Professionalism in Sports, Professional Spo
News GV861-1017 861-1017 Ball Games: Baseball, football, golf, etc.
News KF1091-1137 1091-1137 Carriers, Carriage of Goods and Passen
News GV712-725 712-725 Athletic Contests, Sports Events
News KF3989 3989 Sports, Prizefighting
News GV1040-1060.2 1040-1060.2 Cycling, Bicycling, Motorcycling
News GV840.7-857 840.7-857 Winter Sports: Ice Hockey, Skiing, Bobsl
News SF305-307 305-307 Driving
(b)
Netscape: Infoseek: sports car Import acura
File Edit View Go Communicator Help
Back Forward Reload Home Search Guide Print Security Stop
Automotive >
Automotive clubs
Vehicles by type > Sports cars > Sports car sites
News & publications > Auto magazines
Makes & models > Acura > Acura Integra
Buy a car > Automotive classifieds
Sports > Motorsports > Auto-racing organizations

FIG. 2

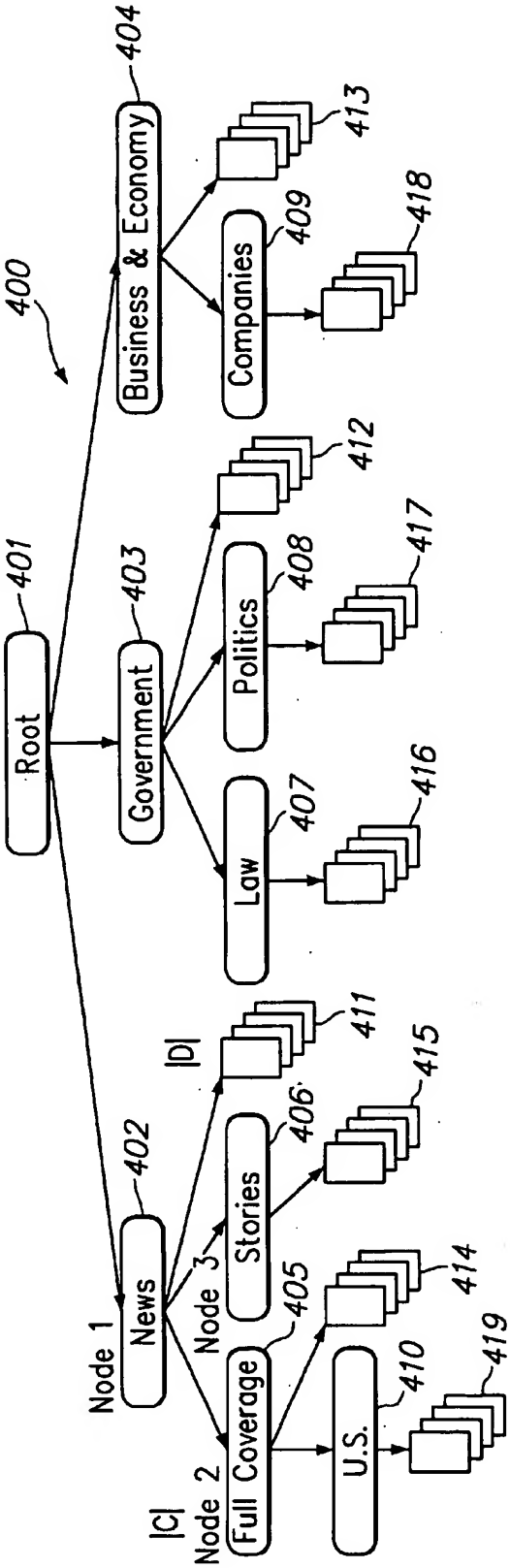
400
Root
401
Business & Economy
404
Companies
409
Government
403
Politics
408
Law
407
News
402
Stories
406
Full Coverage
405
U.S.
410
Node 1
Node 2
Node 3
|C|
|D|
411
412
413
415
416
417
418
419

FIG. 4

InsertDoc(Node N, Document D)
 if ($N.N$ is empty OR $|D.C| = N.d$) then AddDoc(N, D)
 else
  $j = N.d + 1$
  find $\{N_i \in N.N | N_i.l = D.C_j\}$
  if (found such N_i) then InsertDoc(N_i,D)
  else AddDoc(N, D)
AddDoc(Node N, Document D)
 $N.\mathcal{L} = N.\mathcal{L} \cup \{D\}$
 if ($N.\delta \geq \alpha + \delta_{split}$) then Split($N$)

FIG. 5A

Split(Node N)
 $j = N.d + 1$
 $C\mathcal{L} = \{\forall \mathcal{L}_i \in N.\mathcal{L}$, choose distinct $N.L_i.C_j\}$
 $Count_i = \{$ number of $D.L_k \mid D.L_k.C_j = CL_i\}$
 $\forall L_i \in C\mathcal{L}$, if $Count_i < \pi$ then $C\mathcal{L} = C\mathcal{L} \backslash L_i$
 choose k labels $\{L_{\alpha 1}, L_{\alpha 2}, \ldots, L_{\alpha k}\} \in C\mathcal{L}$ such that
  1. $N.\delta + k - (Count_{\alpha 1} + Count_{\alpha 2} + \ldots + Count_{\alpha k}) \geq \alpha - \delta_{merge}$
  2. min $|N.\delta + k - (Count_{\alpha 1} + Count_{\alpha 2} + \ldots + Count_{\alpha k}) - \alpha|$
  3. min (k)
 if those 3 conditions are met then
  create subnodes $\{\forall i \in \{1,2,\ldots,k\}\ N_{\alpha i} \mid N_{\alpha i}.l = L_{\alpha i}\}$
  $\forall L_i \in N.\mathcal{L}$, move $N.\mathcal{L}_i$ to $N_{\alpha k}$ if $N.L_i.C_j = N_{\alpha k}.l$
  $N.N = N.N \cup \{N_{\alpha 1}, N_{\alpha 2}, \ldots, N_{\alpha k}\}$

FIG. 5B

Document	Category
1	News: Full Coverage: Sport: Football
2	News: Full Coverage: Sport: Basketball: Michael Jordan
3	News: Full Coverage: Sport: Soccer: Worl Cup 98
4	News: Full Coverage: Sport: Hockey
5	News: Full Coverage: Sport: Olympics
6	News: Full Coverage: Country: U.K.
7	News: Full Coverage: Country: France
8	News: Full Coverage: Country: Japan
9	News: Full Coverage: Entertainment: New Movies
10	News: Full Coverage: Entertainment: Music: Top 10 Hits
11	News: Full Coverage: Entertainment: Music Jazz
12	News: Full Coverage: Business: Stock Market
13	News: Full Coverage: Business: Companies
14	News: Full Coverage: Science: Biology
15	News: Full Coverage: Science: Electronic Commerce
16	News: Full Coverage: Country: Canada

FIG. 6A

#Documents	Category
5	News: Full Coverage: Sport:
4	News: Full Coverage: Country
3	News: Full Coverage: Entertainment
2	News: Full Coverage: Business
2	News: Full Coverage: Science

FIG. 6B

DeleteDoc(Node N, Document D)
$N.\mathcal{L} = N.\mathcal{L} \setminus \{D\}$
if ($N.\mathcal{N} = \emptyset$ AND $|N.\mathcal{L}| < \pi$) then move $N.\mathcal{L}$ to its parent node, and remove this node
else if ($N.\delta \leq \alpha - \delta_{merge}$) then Merge($N$)

FIG. 7A

Node: Full Coverage
Country *(subnode)* Entertainment *(subnode)* U.S. *(subnode)* News: Full Coverage: Sport: Football News: Full Coverage: Sport: Basketball: Michael Jordan News: Full Coverage: Sport: Soccer: World Cup 98 News: Full Coverage: Sport: Hockey News: Full Coverage: Sport: Olympics News: Full Coverage: Business: Stock Market News: Full Coverage: Business: Companies News: Full Coverage: Science: Biology News: Full Coverage: Science: Electronic Commerce
Node: Full Coverage: Country
News: Full Coverage: Country: Canada News: Full Coverage: Country: U.K. News: Full Coverage: Country: France News: Full Coverage: Country: Japan
Node: Full Coverage: Entertainment
News: Full Coverage: Entertainment: New Movies News: Full Coverage: Entertainment: Music: Top 10 Hits News: Full Coverage: Entertainment: Music: Jazz

FIG. 6C

Merge(Node N)

choose k subnodes $\{N.N_{\alpha 1}, N.N_{\alpha 2}, \ldots, N.N_{\alpha k}\} \in N.\mathcal{N}$ such that

1. $N.\delta - k + |N.N_{\alpha 1}.\mathcal{L}| + |N.N_{\alpha 2}.\mathcal{L}| + \ldots + |N.N_{\alpha k}.\mathcal{L}| \leq \alpha + \delta_{split}$
2. min $|N.\delta - k + |N.N_{\alpha 1}.\mathcal{L}| + |N.N_{\alpha 2}.\mathcal{L}| + \ldots + |N.N_{\alpha k}.\mathcal{L}| - \alpha|$
3. max (k)

if those 3 conditions are met then

$\forall N.N_{\alpha i} \in \{N.N_{\alpha 1}, N.N_{\alpha 2}, \ldots, N.N_{\alpha k}\}$

$N.\mathcal{L} = N.\mathcal{L} \cup \{N.N_{\alpha i}.\mathcal{L}\}$

$N.N_{\alpha i}.\mathcal{L} = \emptyset$

if ($N.N_{\alpha i}$ is empty) then $N.\mathcal{N} = N.\mathcal{N} \setminus N.N_{\alpha i}$

else if ($N.N_{\alpha i}.\delta \leq \alpha - \delta_{merge}$) then Merge($N.N_{\alpha i}$)

FIG. 7B

Node: Full Coverage
Business *(subnode)* Country *(subnode)* Entertainment *(subnode)* U.S. *(subnode)* News: Full Coverage: Sport: Basketball: Michael Jordan News: Full Coverage: Sport: Soccer: World Cup 98 News: Full Coverage: Science: Biology
Node: Full Coverage: Business
News: Full Coverage: Business: Stock Market News: Full Coverage: Business: Companies
Node: Full Coverage: Country
News: Full Coverage: Country: Canada News: Full Coverage: Country: U.K. News: Full Coverage: Country: France News: Full Coverage: Country: Japan
Node: Full Coverage: Entertainment
News: Full Coverage: Entertainment: New Movies News: Full Coverage: Entertainment: Music: Top 10 Hits News: Full Coverage: Entertainment: Music Jazz
Node: Full Coverage: U.S.
News: Full Coverage: U.S.: Senate News: Full Coverage: U.S.: Elections

FIG. 8A

Node: Full Coverage
Entertainment *(subnode)* News: Full Coverage: Sport: Basketball: Michael Jordan News: Full Coverage: Sport: Soccer: World Cup 98 News: Full Coverage: Science: Biology News: Full Coverage: Business: Stock Market News: Full Coverage: Business: Companies News: Full Coverage: Country: Canada News: Full Coverage: Country: U.K. News: Full Coverage: Country: France News: Full Coverage: Country: Japan News: Full Coverage: U.S.: Senate News: Full Coverage: U.S.: Elections
Node: Full Coverage: Entertainment
News: Full Coverage: Entertainment: New Movies News: Full Coverage: Entertainment: Music: Top 10 Hits News: Full Coverage: Entertainment: Music: Jazz

FIG. 8B

FIG. 9

FIG. 9A	FIG. 9B

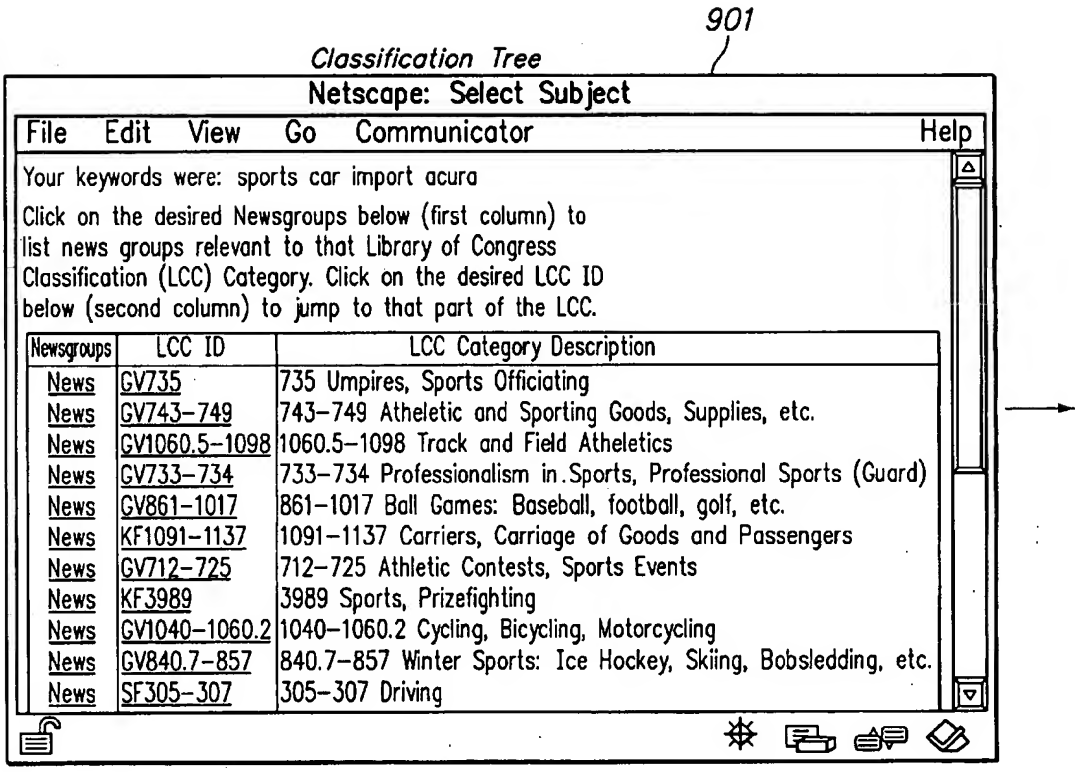

FIG. 9A

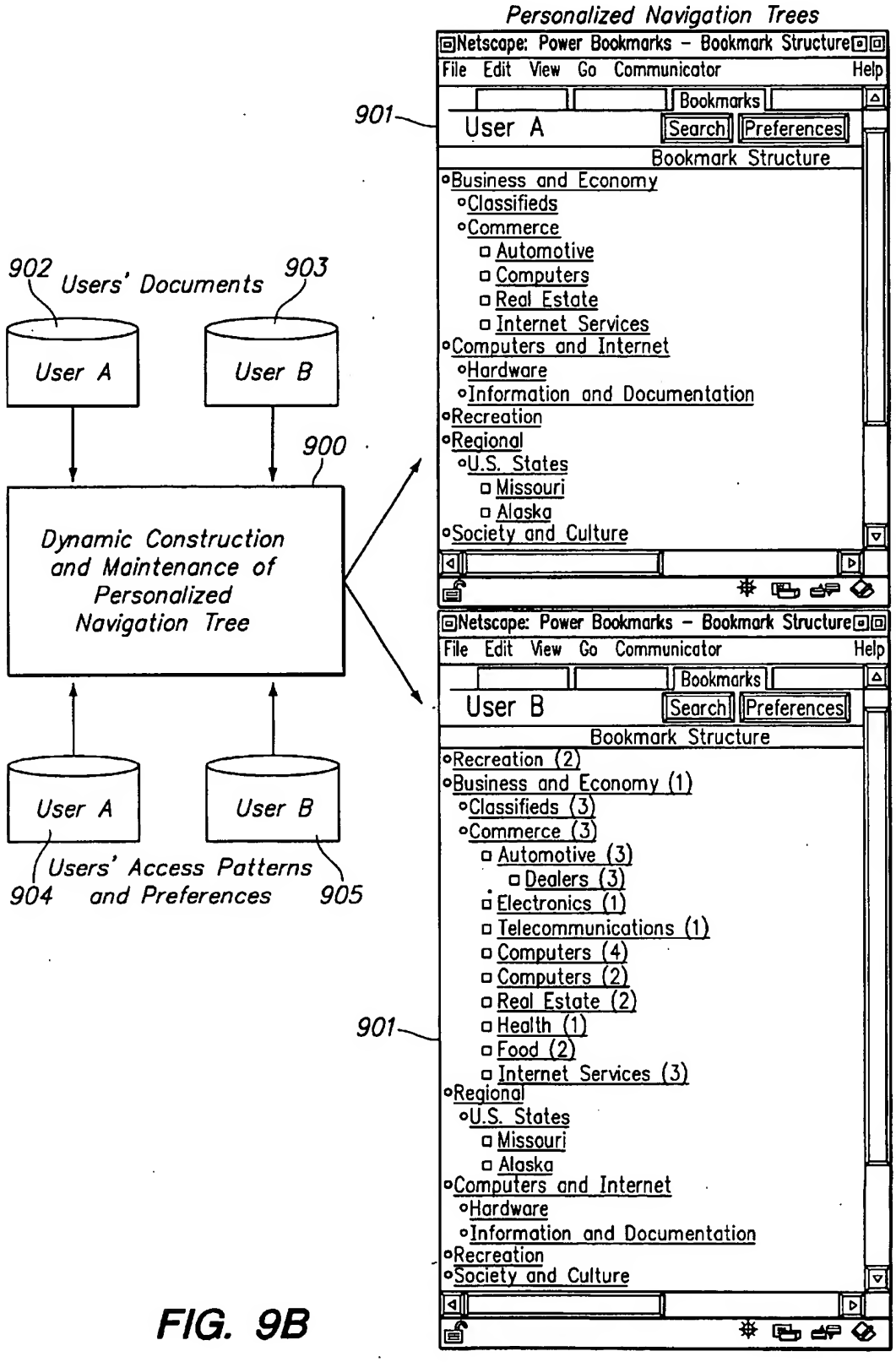
Personalized Navigation Trees
902
Users' Documents
903
User A
User B
900
Dynamic Construction and Maintenance of Personalized Navigation Tree
User A
User B
Users' Access Patterns and Preferences
904
905
901
Netscape: Power Bookmarks - Bookmark Structure
File Edit View Go Communicator Help
Bookmarks
User A
Search
Preferences
Bookmark Structure
Business and Economy
Classifieds
Commerce
Automotive
Computers
Real Estate
Internet Services
Computers and Internet
Hardware
Information and Documentation
Recreation
Regional
U.S. States
Missouri
Alaska
Society and Culture
Netscape: Power Bookmarks - Bookmark Structure
File Edit View Go Communicator Help
Bookmarks
User B
Search
Preferences
Bookmark Structure
Recreation (2)
Business and Economy (1)
Classifieds (3)
Commerce (3)
Automotive (3)
Dealers (3)
Electronics (1)
Telecommunications (1)
Computers (4)
Computers (2)
Real Estate (2)
Health (1)
Food (2)
Internet Services (3)
Regional
U.S. States
Missouri
Alaska
Computers and Internet
Hardware
Information and Documentation
Recreation
Society and Culture

FIG. 9B

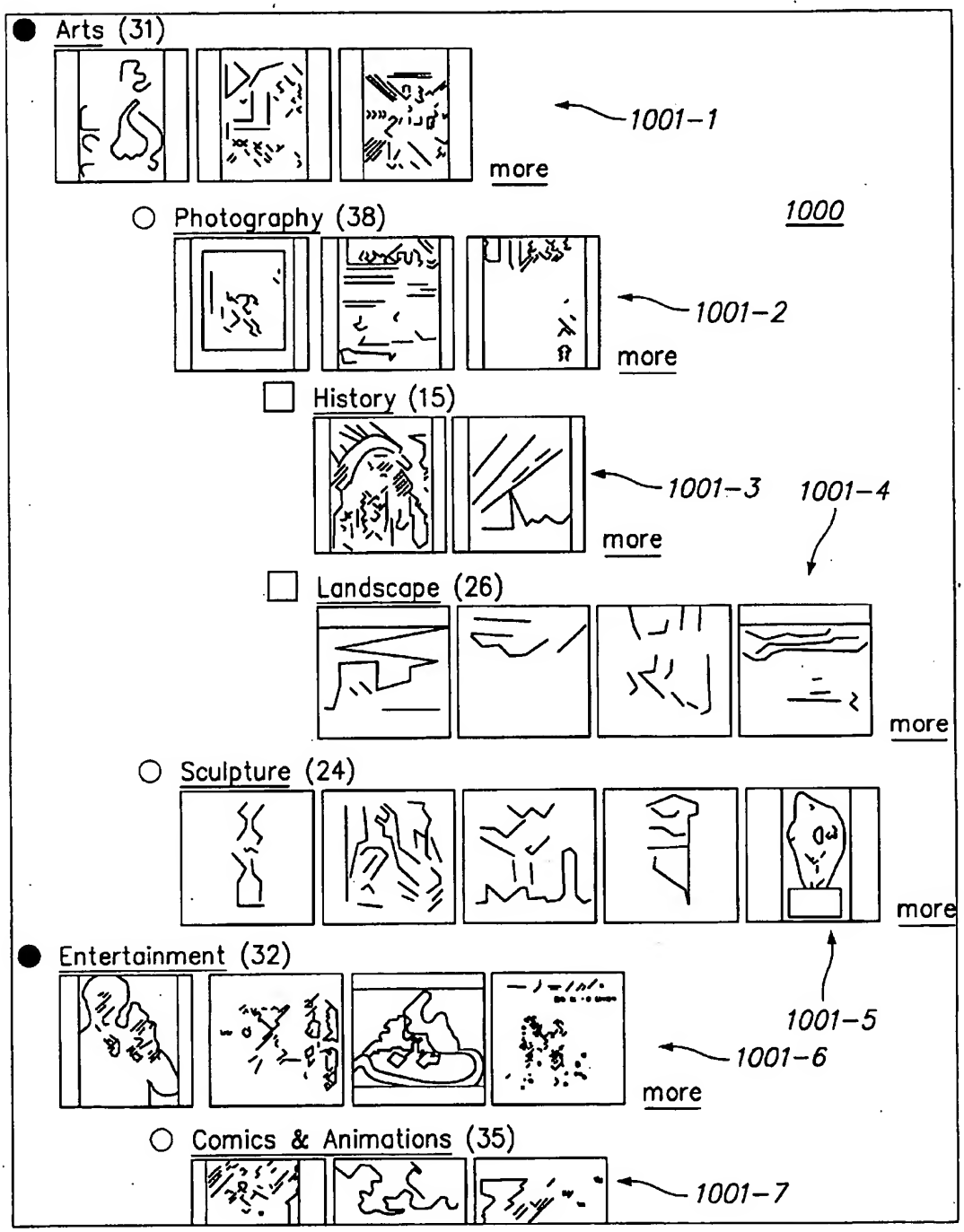
Arts (31)
1001-1
more
1000
Photography (38)
1001-2
more
History (15)
1001-3
1001-4
more
Landscape (26)
more
Sculpture (24)
more
Entertainment (32)
1001-5
1001-6
more
Comics & Animations (35)
1001-7

FIG. 10

PERSONALIZED NAVIGATION TREES

CROSS REFERENCE TO RELATED APPLICATION

The present application is a related to copending U.S. patent application ("the '759 Patent Application"), entitled "Advanced Web Bookmark Database System," Ser. No. 09/184,759, filed on Nov. 2, 1998, and assigned to NEC USA, Inc., which is also the Assignee of the present invention. The disclosure of the '759 Patent Application is hereby incorporated by reference in its entirety.

The present Application is also related to U.S. patent application (the "PowerBookmark Application"), entitled "System for Personalizing, Organizing and Managing Web Information," Ser. No. 09/273,808, filed on Mar. 22, 1999 now pending the same day as the present Application, and assigned to the Assignee of the present invention. The disclosure of the PowerBookmark Application is hereby incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to organizing documents retrieved from the world wide web (WWW) or intranets. In particular, the present invention relates to organizing such documents under a classification scheme for efficient access.

2. Discussion of the Related Art

Two approaches to document organization are clustering (i.e., non-supervised learning) and classification (i.e., supervised learning). The major difference between clustering and classification is that clustering does not rely on a training set but classification does.

In one clustering technique, documents are dynamically clustered based on similarity. However, such an approach suffers from several shortcomings. First, the classification accuracy depends heavily on the number of documents in the database. Second, choosing good labels for categories generated based on clustering is difficult since the labels selected may not be meaningful to the users. To choose good labels for generated categories, many techniques based on word frequency analysis have been proposed. In general, however, these techniques have not been found effective. Consequently, for navigation purpose, clustering techniques are inferior to manual classification and labeling.

Classification is a method for both organizing documents in a document database and facilitating navigation of such a document database. Existing classifiers, such as Library of Congress Classification (LCC), can be used to organize local collections of documents. However, LCC's classification and category labels are usually too fine (e.g. six to seven levels) for organizing relatively smaller local collections of documents.

For client side document categorization, such as organizing bookmarks and electronic mail ("emails") for individual users, the clustering approach is mainly chosen because a large document set is not available at the client side to train the classifier. On the other hand, at the server side, since abundant training data are available, the classification approach is often chosen.

Using the clustering approach to organize client documents (e.g., bookmarks and emails) suffers from many shortcomings resulting from the small document set at the client side. A small document set can generate clusters of no statistical significance and thus, when a small number of documents is added, which is proportionally large to the document set, the clusters can be easily changed.

SUMMARY OF THE INVENTION

The present invention provides a method for providing, on the client side, a navigation tree using an external classifier. The method comprises a maintenance method including a method for merging a parent internal node and leaf nodes, and a method for splitting an internal node in a parent internal node. In one embodiment, each leaf node represents a document in the navigation tree and each internal node is associated with a label representing a category of classification of the child internal nodes and leaf nodes associated with the parent internal node.

According to one aspect of the invention, a document insertion method is provided which inserts a document into the navigation tree according to a classification obtained from an external classifier using keywords in the document. The method also provides a document deletion method for deleting a document from the navigation tree. The method for splitting an internal node of a parent internal node is invoked by the document insertion method when a predetermined criterion is met. Similarly, the method for merging a parent internal node is invoked by the document deletion method when another predetermined criterion is met.

In one embodiment, the document insertion method and the document deletion method each include a step tending to maintain a preferred breadth of an internal node of the navigation tree to a predetermined value α, being a desired number of child internal nodes and leaf nodes of a parent internal node.

The method of splitting an internal node of a parent internal node assigns leaf nodes to a new internal node, such that the total number of internal nodes and leaf nodes of the parent node is kept at a minimum after splitting. The predetermined criterion is met in the method for splitting a parent internal node when the total number of leaf nodes and internal nodes associated with the parent internal node is greater the sum of a predetermined value α and a predetermined value δ_{split}. The method selects a minimum number of internal nodes for splitting, subject to a constraint ("constrained minimum"). In one embodiment, the constraint minimum applies when multiple internal nodes can be selected for splitting to result in the same net change in the total number of leaf nodes and internal nodes.

The method of merging a parent internal node assigns leaf nodes of an internal node to the parent internal node, such that the total number of internal nodes and leaf nodes of the parent node after merging is minimized. The predetermined criterion is met in the method of merging a parent internal node when the total number of leaf nodes and internal nodes associated with the parent internal node is less than the difference of a predetermined value α and a predetermined value δ_{merge}. The method of merging a parent internal node selects a constrained maximum number of leaf nodes for merging. In one embodiment, the constraint minimum applies when multiple internal nodes can be selected for splitting to result in the same net change in the total number of leaf nodes and internal nodes.

In one embodiment, the predetermined value α, the predetermined value δ_{split} and the predetermined value δ_{merge} are each user independently selectable.

In one embodiment, the method of the present invention assigns a document (i.e., a leaf node) to internal nodes according to an access frequency of the document. The internal node selected for each document is intended to minimize the number of steps necessary to reach a frequently accessed document.

The present invention is better understood upon consideration of the detailed description below and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. **1**(*a*)–**1**(*c*) show three document sets **101**, **102** and **103** of different sizes.

FIG. **2**(*a*) shows the classifications of a number of keywords under the Library of Congress (LCC) classification scheme.

FIG. **2**(*b*) shows the classifications of the same keywords of FIG. **2**(*a*) returned from an internet search engine.

FIG. **3** shows the classifications of keywords "Web" and "Database" returned from an inquiry to an internet search engine;

FIG. **4** shows an example navigation tree **400**.

FIG. **5**(*a*) provides the pseudocode for inserting document D into node N of a navigation tree.

FIG. **5**(*b*) provides the pseudocode for splitting a node N.

FIG. **6**(*a*) shows a table listing the documents of a node N before a split operation.

FIG. **6**(*b*) shows a table listing the categories of node N of FIG. **6**(*a*) before a split operation.

FIG. **6**(*c*) shows the documents and groups of node N of FIG. **6**(*a*) after a split operation and the documents of new subnodes created by the split.

FIGS. **7**(*a*) and **7**(*b*) show respectively the pseudocode for deleting a document D from a node N, and the pseudocode for merging the subnodes of node N into the node N.

FIG. **8**(*a*) shows the documents and groups of a node N after a file is deleted.

FIG. **8**(*b*) shows the documents and groups of node N of FIG. **8**(*a*) after a merge operation has taken place.

FIG. **9** is a schematic representation of one embodiment of the present invention.

FIG. **10** shows a screen image of a navigation tree **100** in an exemplary image libary.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Classification information can be obtained from content providers (e.g., a library or a Web search engine), which have large document sets and computing resources to run sophisticated classifiers. Today, some servers classify each document into categories that are returned with the document. Many servers, although not providing categories explicitly, allow a user to extract keywords from the document to query the server for possible categories. For instance, with the keyword "XML", a classifier returns the category label "Computers and Internet/Information and Documentation/Data Formats/XML".

Without modification, the returned category labels cannot be used to organize documents. For example, FIGS. **1**(*a*)–**1**(*c*) show two document sets **101**, and **102** of different sizes. Document set **101** of FIG. **1**(*a*) includes millions of documents. As a result, a classification tree with very fine categories (e.g., with a tree depth of 7 or 8) may be required. In contrast, Document set **102** of FIG. **1**(*b*) is relatively small—including document subset **102***a* (for User A) and document subset **102***b* (for Library B), having only a few hundred documents and a few thousand documents, respectively. Thus, providing document subset **102***a* and document subset **102***b* the same fine classification tree categories as document set **101** results in deep but sparse trees which require many traversal steps to reach a document. Such deep tree structures yield poor performance and lower usability.

Depth and breadth tradeoff is known from graphical user interface menu design. A "rule of thumb" fixes the short-term memory span of a human being to hold between 5 to 9 items (the so-called "magic number"). A recent study on depth and breadth tradeoff shows that, while increased depth did harm search performance, and moderate depth and breadth outperformed the broadest, shallow structure overall. Thus, document subsets **102***a* and **102***b* should be organized in FIG. **1**(*c*) by classification trees **103***a* and **103***b* of moderate depths and breadths for efficient navigation. Ideally, the breadth of each node in the tree should be close to the magic number or other breadth of the users' preferences. At the same time, the tree structure should be kept as shallow as possible consistent with classification accuracy. Tree structures **103***a* and **103***b* of FIG. **1**(*c*) are referred to as navigational classification trees, or simply "navigation trees" to distinguish from classification trees of FIGS. **1**(*a*) and **1**(*b*).

The present invention provides a method for constructing, on the client side, a navigation tree based on existing classifiers (e.g., Library of Congress Classification (LCC)) which have deep classification trees for indexing a large amounts of documents. One embodiment of the present invention is shown schematically as system **900** in FIG. **9**. In system **900**, before introducing a document into a navigation tree, an external classifier is queried using information contained in the document. In response, the external classifier returns a classification tree **901**. From classification tree **901** returned from the classifier, the method of the present invention constructs a navigation tree adaptively to the size of the user's document collection on the client side. Further, a user can specify a breadth preference, such as 10, according to the magic number rule of thumb. Other examples of preferences that can be used to customize construction of the navigation tree include access frequency, multiple classifications, and user-provided classifications, which are discussed in further detail below. As shown in FIG. **9**, system **900** is a multi-user system providing for each user (e.g. user "A" and user "B") personalized navigation trees **906** and **907**, according to each user's access pattern and preferences (represented by data sets **904** and **905**, for users A and B respectively), and the characteristics of the user's document collection (represented by data sets **902** and **903**). The methods of system **900** is provided in further detail below.

The method of the present invention can split and merge nodes as required to maintain both preferable breadth and classification correctness. Thus, a method of the present invention adaptively maintains a navigation tree structure more preferable to effective document retrieval and higher usability of a document database. One method of the present invention is implemented in a bookmark management system described in the copending Bookmark Application incorporated by reference above. Thus, a detailed description of the bookmark management system is not repeated.

A number of classifiers are available on-line to use and many of them are well-built based on millions of documents. Most of such classifications are done manually by domain experts, so that the accuracy of classifications is typically high. FIG. **2**(*a*) shows a classification based on LCC for a document with the keywords "sports", "car", "import", and "acura". Each LCC ID represents a node in the Library of Congress classification hierarchical structure. The tag of a node is a label in a path from the top level root node to the node into which the document is classified. Some existing search engines also provide classification functionalities, such as the example shown in FIG. **2**(*b*).

According to the present invention, when a document is introduced, the classification categories of the document are identified in the following two steps:

1. Extracting significant keywords from documents: for example, nouns with high occurrence frequency are significant keywords. In this step, techniques, such as morphing and stop word filtering, are applied.
2. Querying the classifier: for example, using the keywords extracted from the document, a classifier is queried as to the categories the document belongs. The classifier may return multiple classification categories because the meaning of a document could be ambiguous.

To illustrate this approach, suppose a document has significant keywords "Web" and "Database", which are then used to query a classifier. The classifier returns a number of categories each represented as a path. These categories are shown in FIG. 3.

To organize documents for ease of navigation and quick document lookup, the management of a category tree must satisfy the following three requirements: document density, structural stability and adaptability. To achieve high document density, documents should fill the topmost nodes as much as possible (up to the magic number or user's preferred breadth) to facilitate quick access to a larger number of documents. Structural stability is necessary to avoid frequent confusing navigation tree reorganizations that confuse the user. When the navigation tree has to be reorganized for usability reasons, the changes are made in a least disruptive manner. Adaptability of the navigation tree is necessary to accommodate the user's usability preferences. For instance, for the user who prefers specificity to generality, a deeper tree may be more desirable. For the user who prefers high usability, keeping those frequently accessed documents in a shallower node has been shown more effective.

A navigation tree contains internal vertices, representing categories, and external vertices, representing documents. For convenience, we refer to an internal vertex as a "node" and an external vertex as a "leaf". To facilitate description, the following naming convention is adopted:

"T" denotes a navigation tree and also its root node;

"N" denotes an internal node;

"L" denotes a leaf node;

"|S|" denotes the number of elements in set S;

"N.N" denotes the set of internal child nodes of N;

"N.N" denotes the set of internal nodes of N;

"$N.N_i$" denotes an internal child node i of node N;

"$N.N_i$" denotes the ith child internal node of node N;

"N.L" denotes the set of child leaf nodes of node N;

"$N.L_i$" denotes the ith child leaf node of node N;

"N.d" denotes the depth of node N;

"N.δ" denotes the breadth of node N (N.δ=|N.N|+|N.L|);

"N.l" denotes a label of the node N;

"L.C" denotes the category of leaf node L;

"$L.C_i$" denotes the ith label of category of the leaf node L;

"γ(D.C)" denotes the function returning the number of levels of document D's category label;

"π" denotes the minimum number of leaves per node;

"α" denotes the preferable breadth in a node;

"δ^{split}" denotes the threshold beyond á for splitting a node;

"δ_{merge}" denotes the threshold below á for merging nodes;

To identify a node uniquely, labels from the root node T to node N are concatenated. Each node thus has a unique name, since each tree path is unique. FIG. 4 shows an example navigation tree **400**. Labeled rectangles **401–410** (e.g.,"News" and "Government") are categories and shaded boxes **411–419** are documents. For example, following a category label "News/Full Coverage", the "Full Coverage" sub-category **405** is located under the "News" category **402**. Node **402** has the label "News", a depth of one, and a breadth is 6, since it contains two sub-categories "Full Coverage" (node **405**) and "Stories" (node **406**) and four documents. Documents in node **405** are categorized as "News: Full Coverage". The second label of such category is "Full Coverage".

The control parameters "α", "δ_{split}", and "δ_{merge}" are provided for achieving structural stability and adaptability. In the following example, to simplify discussion, each document is assumed to belong to one and only one category initially. The extension to multiple category classification is discussed below after the following example.

When a user inserts a document, the classification category of the document is obtained from a classifier. Then, the document is inserted into navigation tree **400** in two steps. First, the category label of the document is followed to place the document in the deepest possible existing node in the current tree where the label of such a node matches the category of the document. Then, the node where the document is inserted is split, if a split condition is met. The pseudocode for inserting document D into node N is provided in FIG. **5**(*a*). The pseudocode for splitting node N is provided in FIG. **5**(*b*)

In the pseudocode of the FIG. **5**(*a*), a recursive procedure InsertDoc inserts document D into node N. From the specified node N, the navigation tree is recursively traversed along the path with labels matching the labels of document D, until all labels of document D are matched or a leaf node is encountered. For example, when a user inserts a document belonging to the "News/Full Coverage/US/Intern" category into navigation tree **400**, the path "News" (**402**), "Full Coverage" (**405**) and "U.S." (**410**), is traversed and the document is inserted under "U.S." (node **410**). Since the "Intern" category does not exist under "US" (node **410**), the deepest node for the document is node **410** "News/Full Coverage/U.S.".

Next, the node into which the document is inserted is checked if a split should occur. If the number of children of the node exceeds the preferable breadth α by more than δ_{split}, the node is a candidate for splitting. Thus, the split condition is $N.\delta \geq \alpha+\delta_{split}$. When the split condition is met, corresponding subnodes are created, and the documents that belong to the subnodes are moved from node N to the subnodes. To determine how many and which subnodes to create, the three factors of the structural stability requirement are considered:

(*a*) document density—the number of child nodes of node N should be close to α;

(b) minimizing future splits and merges—again, the breadth of node N should be kept as close to α as possible after the split;

and (c) minimizing structural changes—creating a minimum number of subnodes.

When a node is split, its breadth is reduced to a value as close to α as possible. However, the split operation creates ΔN new sub-nodes so that ΔL documents (a negative number) of N can be moved into the new sub-nodes. Thus the change in the breadth of node N is (ΔN+ΔL). More than one set of (ΔN, ΔL) may satisfy the split constraints.

To minimize the structural changes, the present invention selects ($\Delta N+\Delta L$) is minimum. If multiple ΔNs and ΔLs exist such that each ($\Delta N+\Delta L$) is minimum, the present invention selects the set of (ΔN, ΔL) with the smallest ΔN. This heuristic allows more documents, rather than categories, close to the root node T. This choice provides the advantage of finding a target document earlier, since the average depth of a leaf node is minimized.

To illustrate how insert and split operations proceed, suppose a document D with the category "News/Full Coverage/Country/Canada" is inserted into navigation tree **400**. Document D is initially inserted into node **405** ("News/Full Coverage") node. FIG. **6**(*a*) shows Table 1 which lists the 16 documents stored under the "News/Full Coverage" node **405** before document D is inserted. Suppose a is 12 and δ_{split} is 5. Since the total number of child nodes has equaled $a\alpha+\delta_{split}=17$, node **405** (i.e., "News:Full Coverage") may be split. The goal is to create as few subnodes as possible to move down some documents from "Full Coverage". FIG. **6**(*b*) shows a table listing five candidate subnodes of node **405** and the number of documents belonging to each subnode. The groups ("Country", "Entertainment") and ("Country", "Business", "Science") are the best options for splitting, scoring respectively 17+2−(4+3)=12 and 17+3−(4+2+2)=12. Since the goal also is to minimize structural change, the group ("Country", "Entertainment") is selected. Accordingly, subnodes for the "News:Full Coverage:Country" and "News:Full Coverage:Entertainment" categories are formed, and documents (6, 7, 8, 16) and (9, 10, 11) are moved into the "Country" and the "Entertainment" subnodes, respectively. FIG. **6**(*c*) shows a table listing the documents in the Node "News:Full Coverage" and new subnodes "Country" and "Entertainment".

When a document is deleted from a node, the breadth of this node decreases. Under the present invention, when the breadth (N.δ) of a node N drops below the merge threshold δ_{merge}, node N becomes a candidate for a merge operation. When the merge conditions are met, the documents in some subnodes are moved into the parent node. The same factors of structural stability discussed above with respect to splitting a node also determine how many and which subnodes to collapse. Node merge is substantially the reverse operation of node splitting discussed above. When a document is deleted from node N, if the new degree N.δ of node N is less than ($\alpha-\delta_{merge}$), the merge operation is triggered. When subnodes are merged, the breadth of the parent node is increased to a value as close to the preferred breadth α as possible. The merge operation removes ΔN (a negative number) sub-nodes and the ΔL documents contained in removed sub-nodes are moved into the parent node. As in the split condition discussed above, multiple solutions of (ΔN, ΔL) can exist. To preserve structural stability, the solution which minimizes ($\Delta N+\Delta L$) is selected. If multiple sets of (ΔN, ΔL) result in the same value for ($\Delta N+\Delta L$), the (ΔN, ΔL) set with the largest ΔL is selected. Using this heuristic approach, more documents, rather than categories, are made closer to the root node (e.g., node **401** of FIG. **4**). In other words, the average depth of a leaf node in the navigation tree is minimized. Thus, target documents are reached within a smaller expected number of traversal steps of the navigation tree.

FIGS. **7**(*a*) and **7**(*b*) show respectively the pseudocode for deleting a document D from a node N, and the pseudocode for merging the subnodes of node N into the node N, if the conditions described above are satisfied. To illustrate how delete and merge operations proceed, suppose a document D in the category "Full Coverage" (node **405**) is deleted from navigation tree **400**. FIG. **8**(*a*) is a table listing the documents and subnodes of node N after the deletion. Suppose that α is 12 and δ_{merge} is 5. Since the merge condition N.δ<=$\alpha-\delta_{merge}$=7 is met, node **405** (i.e., "News:Full Coverage") may be merged with one or more of its child subnodes. The goal is for the merged node **405** to have documents and child nodes to number as close to α as possible. The groups ("Country", "Entertainment") and ("Country", "Business", "U.S.") are candidates for merging, scoring respectively 7+4+3=14 and 7+4+2+2=15. Since the goal also is also to minimize as many categories as possible, the group ("Country", "Business", "U.S.") is selected. FIG. **8**(*b*) shows a table listing the documents in node "Full Coverage" after subnodes "Country" "Business" and "U.S." are merged into node "Full coverage".

The present invention is adaptive to various usability preferences:

(a) General versus specific: some users prefer to keep all files in one directory, while others may prefer to organize files into a deep hierarchical tree. Thus, user preferences are accommodated by allowing a user to change the value of α. A larger α value results in a shallower navigation tree having more general categories. Conversely, a smaller α value provides a deeper tree with more specific classification categories.

(b) Frequency of navigation tree reorganization: the values of δ_{split} and δ_{merge} can be varied by the user to achieve the desired frequency of navigation tree reorganization if δ_{split} is set to very large (e.g., infinity), the resulting navigation tree does not split. One the other hand, setting δ_{merge} to very large disables the merge operation. (Infrequent merge operations enhances structural stability)

(c) Manual categorization: a user manually assigns categories to selected documents that are different from categories assigned by the classifier. For example, a "Starr Report" may be categorized by a classifier into the category "Government: US Government: Politics". In the present embodiment, the user can reclassify the "Starr Report" to a "News Event" folder, and override any automatically assigned category.

(d) Access Frequency: in one embodiment, a document's frequency of access affects its classification. For example, the number of traversal steps to reach a document can be used to determine whether or not a document is to be moved to sub-categories. In one scheme, a less frequently accessed document should be provided a longer tree path over a more frequently accessed document. Similarly, in determining which document to merge into super-categories, more frequently accessed documents are given preference over less frequently accessed documents.

(e) Multiple categories: a document may be classified by the content providers into multiple categories. For instance, in response to a keyword query using the term "NEC", a commercial search engine returns twelve possible categories to which the related documents may belong. Classifying a document into too many categories conflicts with the purpose of classification. Thus, the embodiment described above allows documents in multiple categories to be "logically" eliminated into fewer categories or a unique category. The logical elimination is carried out in the course of the insertion/split and deletion/merge operations described above.

The pseudocodes for splitting and merging nodes provided in FIGS. **5**(*b*), and **7**(*b*) aim at two goals:

(1) Incremental reorganization of navigation trees, with minimum changes at each split; and

(2) minimizing the depth of navigation trees, while maintaining the preferred breadth of each internal node.

Instead of maintaining the breadth of a node as close to α as possible, the following split policies can be implemented:

(a) Greedy Split: move all (or as many as possible) documents down to the sub-categories to minimize the number-of future splits. (One drawback of this approach is the relatively large effect of a split, so that the user experiences a sudden change in his/her navigation tree).

(b) Maximum Split: Another incremental splitting approach creates a sub-node that has a maximum number of child nodes, rather than maintaining a value close to alpha.

An experiment was conducted to construct classification or navigation trees using the greedy split heuristics and the maximum split heuristics using randomly selected five sets of documents from the Web. The five sets have 100, 200, 300, 400, and 500 documents respectively. Regardless of the splitting scheme used, the approach of the present invention produces shallower trees than the classification trees. In this experiment, a navigation tree under the present invention has an average depth between 2 and 3, as compared with depth of 5 using the classification tree. Also, the approach of the present invention produces a more compact tree in terms of both the depth and the breadth. In this experiment, the number of total nodes in the navigation tree is roughly 75% less than the classification tree. This result is reasonable because the approach of the present invention merges many nodes to the higher level to produce a tree with preferable breadth. The approach of the present invention also produces a more dense tree with fewer internal nodes for the same number of documents in the navigation tree. Thus, the approach of the present invention maintains an actual breadth (i.e., density) close to the desired navigation tree breadth, thereby assuring better performance in navigation.

The experiment also shows the split heuristics in the pseudocodes of FIG. **5**(*b*) outperforms the "maximum split" and "greedy split" heuristics, since the heuristics in the pseudocodes of FIG. **5**(*b*) yields the most shallow and dense tree, while maintaining the breadth close to the magical number. Also, the navigation tree resulting from the pseudocodes of FIG. **5**(*b*) is more stable since split operations occur less frequently.

Finally, the deletion operation was tested by interlacing insertions and deletions. In that experiment, 1000 insertions and N deletions were performed, and the results were compared to inserting 1000−N documents into the same initial navigation tree. After these insertions and deletions, the two sets of documents are the same. The experiment showed two similar navigation tree structures having substantially the same average depth of documents and total number of nodes maintained. Hence, the structure of navigation trees maintained by the pseudocodes of FIG. **5**(*a*) are stable and are independent from the order of document insertions and deletions.

The present invention, in addition to being applied in the manner described in the PowerBookmark Application incorporated by reference above, is also applied to an image classification scheme for navigation of a digital image library. In this second application, keywords extracted from the proximity of images in HTML documents are used to query a classifier for their possible categories. Based on the category information returned from the classifier, the images are organized into a tree structure. Image clustering is then performed by visual characteristic, such as color and shape. After clustering, for each cluster, the system selects the image closest to the cluster center as a representative image. The system then displays only the representative images of the more "significant" clusters for each category. In one exemplary implementation, the system displays the representative images for the K largest clusters, such that the number of images in these K clusters exceeds 70% of the total number of images in the category. FIG. **10** shows a screen image of a navigation tree **100** in an exemplary image libary. As shown in FIG. **10**, representative images **1001**-*a* . . . **1001**-*n* are provided for significant clusters of each category in the navigation tree.

The above detailed description is provided to illustrate the specific embodiments of the present invention and is not intended to be limiting. Numerous modifications and variations within the scope of the present invention are possible. The present invention is set forth in the following claims.

We claim:

1. A method for providing a navigation tree, comprising:

providing a maintenance method including a method for merging a parent internal node and leaf nodes, and a method for splitting a parent internal node, wherein each leaf node representing a document in said navigation tree and each internal node being associated with a label representing a category of classification of internal nodes and leaf nodes associated with said internal node, and where said method of merging and said method of splitting include comparison to user determined parameters;

providing a document insertion method, wherein said insertion method inserts a document into said navigation tree according to a classification obtained from an external classifier using keywords in said document; and

providing a document deletion method for deleting a document from said navigation tree;

wherein said document insertion and said document deletion methods each includes a step tending to maintain a breadth of an internal node of said navigation tree to a predetermined value α.

2. A method as in claim **1**, wherein said method for splitting a parent internal node is invoked by said document insertion method when a predetermined criterion is met.

3. A method as in claim **2**, wherein said method of splitting a parent internal node assigns leaf nodes to a new internal node, such that the total number of internal nodes and leaf nodes of said parent node is a minimum.

4. A method as in claim **2**, wherein said criterion is met when the total number of leaf nodes and internal nodes associated with said parent internal node is greater the sum of the predetermined value α, being a value representing a desired number of documents associated with said internal node, and a predetermined value δ_{split}.

5. A method as in claim **4**, wherein said predetermined value δ_{split} is user selectable.

6. A method of claim **2**, wherein said method selects a constrained minimum number of internal nodes for splitting.

7. A method as in claim **1**, wherein said method for merging a parent internal node is invoked by said document deletion method when a predetermined criterion is met.

8. A method as in claim **7**, wherein said method of merging a parent internal node assigns leaf nodes to an internal node to said parent internal node, such that the total number of internal nodes and leaf nodes of said parent node is minimized.

9. A method as in claim **7**, wherein said criterion is met when the total number of leaf nodes and internal nodes

associated with said parent internal node is less than the difference of the predetermined value α, being a value representing a desired number of documents associated with said internal node, and a predetermined value δ_{merge}.

10. A method as in claim **9**, wherein said predetermined value δ_{merge} is user selectable.

11. A method as in claim **7**, wherein said method of merging a parent internal node selects a constrained maximum number of leaf nodes for merging.

12. A method as in claim **1**, wherein said predetermined value α is user selectable.

13. A method as in claim **1**, wherein each leaf node being associated an internal node according to an access frequency of the document associated with said internal node.

14. A method as in claim **1**, wherein said method for splitting a node implements a greedy split policy.

15. A method as in claim **1**, wherein said method for splitting a node implements a maximum split policy.

16. A method as in claim **1**, wherein said document insertion method allows a user-specified classification to override said classification obtained from said external classifier.

17. A method as in claim **1**, wherein said document insertion method further takes into account an access frequency of said document.

18. A method as in claim **1**, wherein said document insertion method retrieves multiple classifications of said document from said external classifier, said document insertion method eliminating one or more of said multiple classifications according to a predetermine criterion.

19. A method as in claim **1**, wherein said navigation tree is created in a bookmark management system.

20. A method as in claim **1**, wherein said navigation tree is provided in a digital image library.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,393,427 B1 Page 1 of 1
DATED : May 21, 2002
INVENTOR(S) : Quoc Vu, Wen-Syan Li and Edward Chang

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 1,
Line 5, delete "a";

Column 5,
Line 65, delete " "δ^{split}" " and insert -- "δ_{split}" --;

Column 7,
Line 15, delete "a" and insert -- α --;
Line 17, delete "a".

Signed and Sealed this

Twenty-ninth Day of October, 2002

Attest:

JAMES E. ROGAN
Director of the United States Patent and Trademark Office

Attesting Officer

US006268849B1

(12) **United States Patent**
Boyer et al.

(10) **Patent No.: US 6,268,849 B1**
(45) **Date of Patent: *Jul. 31, 2001**

(54) **INTERNET TELEVISION PROGRAM GUIDE SYSTEM WITH EMBEDDED REAL-TIME DATA**

(75) Inventors: **Franklin E. Boyer**, Cleveland; **Timothy B. Demers**, Tulsa, both of OK (US)

(73) Assignee: **United Video Properties, Inc.**, Tulsa, OK (US)

(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/107,012**

(22) Filed: **Jun. 30, 1998**

(51) **Int. Cl.**[7] **G06F 3/00**; G06F 15/16; H04N 7/14; H04H 1/02

(52) **U.S. Cl.** **345/327**; 348/12; 348/906; 455/5.1; 709/217

(58) **Field of Search** 345/327; 348/10, 348/12, 13, 906; 455/6.2, 6.3, 5.1, 4.2; 395/200.47, 200.48, 200.49; 709/217–219; H04N 7/173

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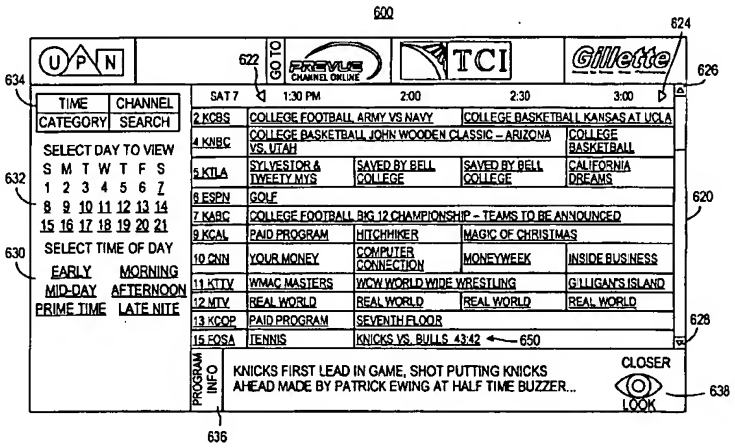
(List continued on next page.)

Primary Examiner—John W. Miller
(74) *Attorney, Agent, or Firm*—Fish & Neave; Brajesh Mohan

(57) **ABSTRACT**

An Internet television program guide system is provided that allows a user at a multimedia system to access television program listings containing embedded real-time data over an Internet communications link. The television program listing may be for a sporting event that is currently being broadcast and the real-time data may be the current score of the event, the current weather where the event is taking place, or any other suitable real-time information on the event. The real-time data may be presented in the form of video stills, video clips, textual information, audio clips, or suitable combinations of such media. The user can perform database searches on the program guide listings to search for a desired program. If desired, the user can obtain additional information on a selected program by accessing an associated web page.

64 Claims, 14 Drawing Sheets



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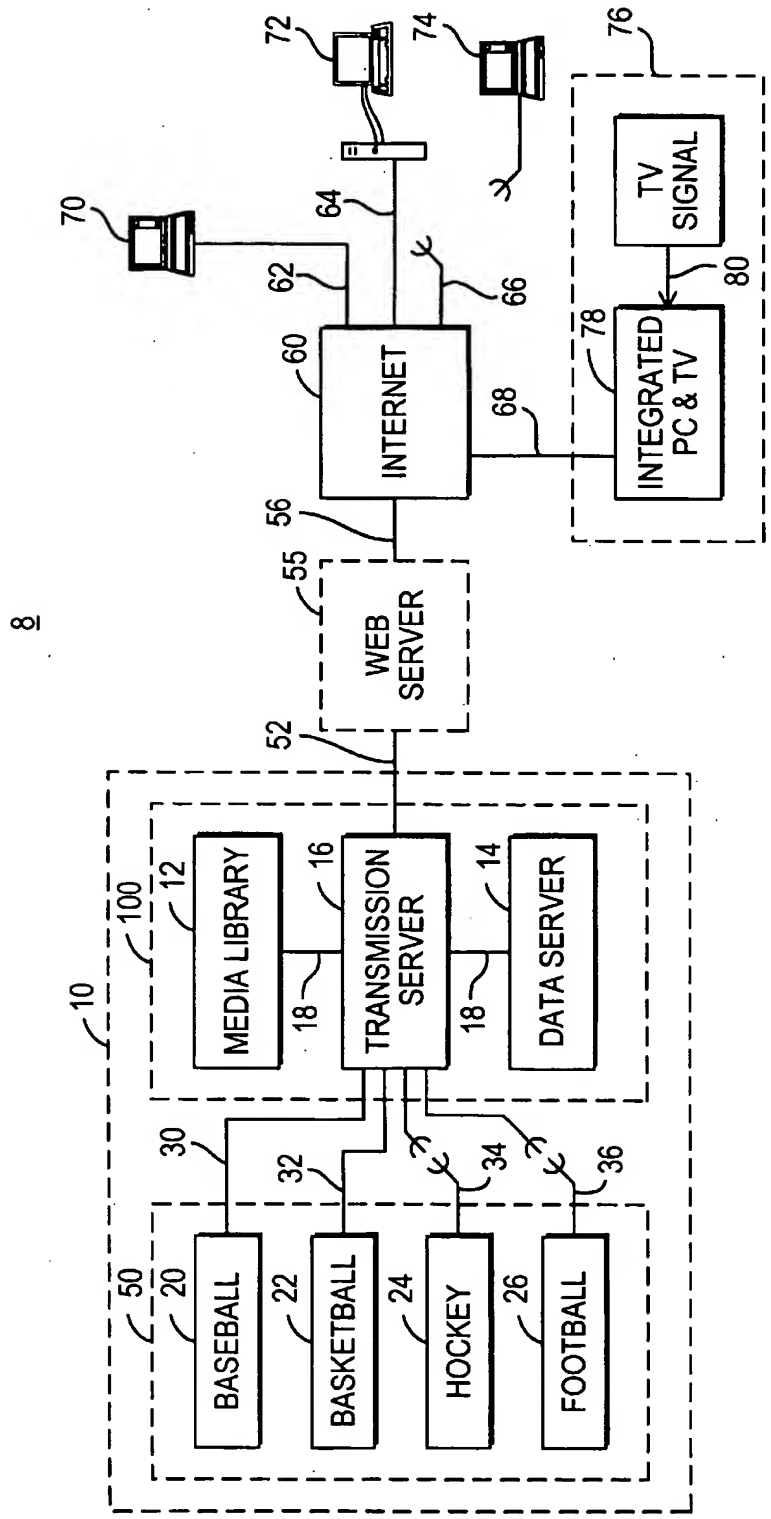

8
10
100
12
MEDIA LIBRARY
16
TRANSMISSION SERVER
14
DATA SERVER
18
18
30
32
34
36
50
20
BASEBALL
22
BASKETBALL
24
HOCKEY
26
FOOTBALL
52
55
WEB SERVER
56
60
INTERNET
62
64
66
68
70
72
74
76
78
INTEGRATED PC & TV
TV SIGNAL
80

FIG. 1

FIG. 2

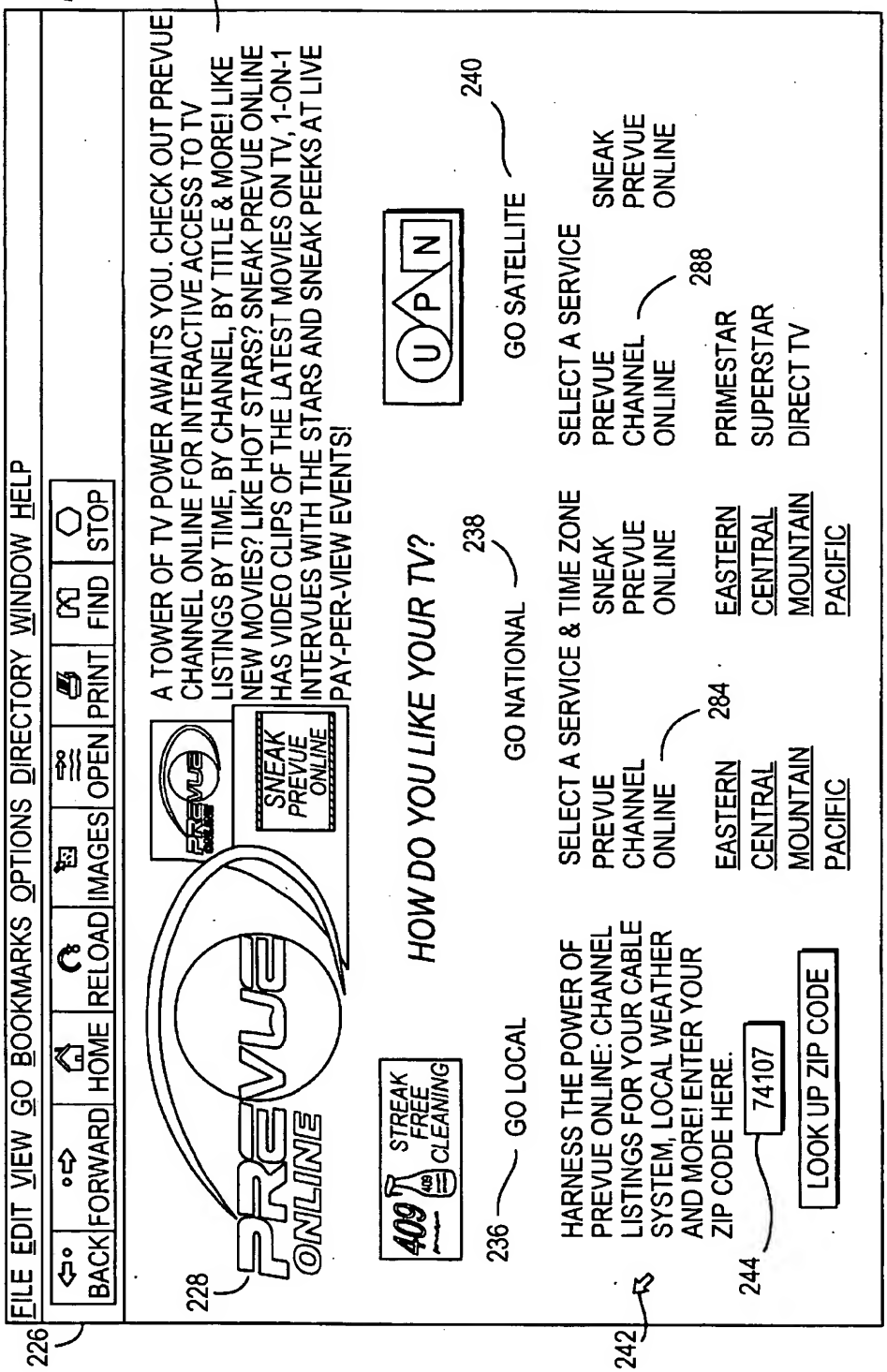

200
FILE EDIT VIEW GO BOOKMARKS OPTIONS DIRECTORY WINDOW HELP
BACK
FORWARD
HOME
RELOAD
IMAGES
OPEN
PRINT
FIND
STOP
226
228
PREVUE ONLINE
SNEAK PREVUE ONLINE
A TOWER OF TV POWER AWAITS YOU. CHECK OUT PREVUE CHANNEL ONLINE FOR INTERACTIVE ACCESS TO TV LISTINGS BY TIME, BY CHANNEL, BY TITLE & MORE! LIKE NEW MOVIES? LIKE HOT STARS? SNEAK PREVUE ONLINE HAS VIDEO CLIPS OF THE LATEST MOVIES ON TV, 1-ON-1 INTERVUES WITH THE STARS AND SNEAK PEEKS AT LIVE PAY-PER-VIEW EVENTS!
230
409 STREAK FREE CLEANING
HOW DO YOU LIKE YOUR TV?
UPN
240
236
GO LOCAL
238
GO NATIONAL
GO SATELLITE
HARNESS THE POWER OF PREVUE ONLINE: CHANNEL LISTINGS FOR YOUR CABLE SYSTEM, LOCAL WEATHER AND MORE! ENTER YOUR ZIP CODE HERE.
242
244
74107
LOOK UP ZIP CODE
SELECT A SERVICE & TIME ZONE
PREVUE CHANNEL ONLINE
SNEAK PREVUE ONLINE
284
EASTERN
CENTRAL
MOUNTAIN
PACIFIC
SELECT A SERVICE
PREVUE CHANNEL ONLINE
SNEAK PREVUE ONLINE
288
PRIMESTAR
SUPERSTAR
DIRECT TV

FIG. 3

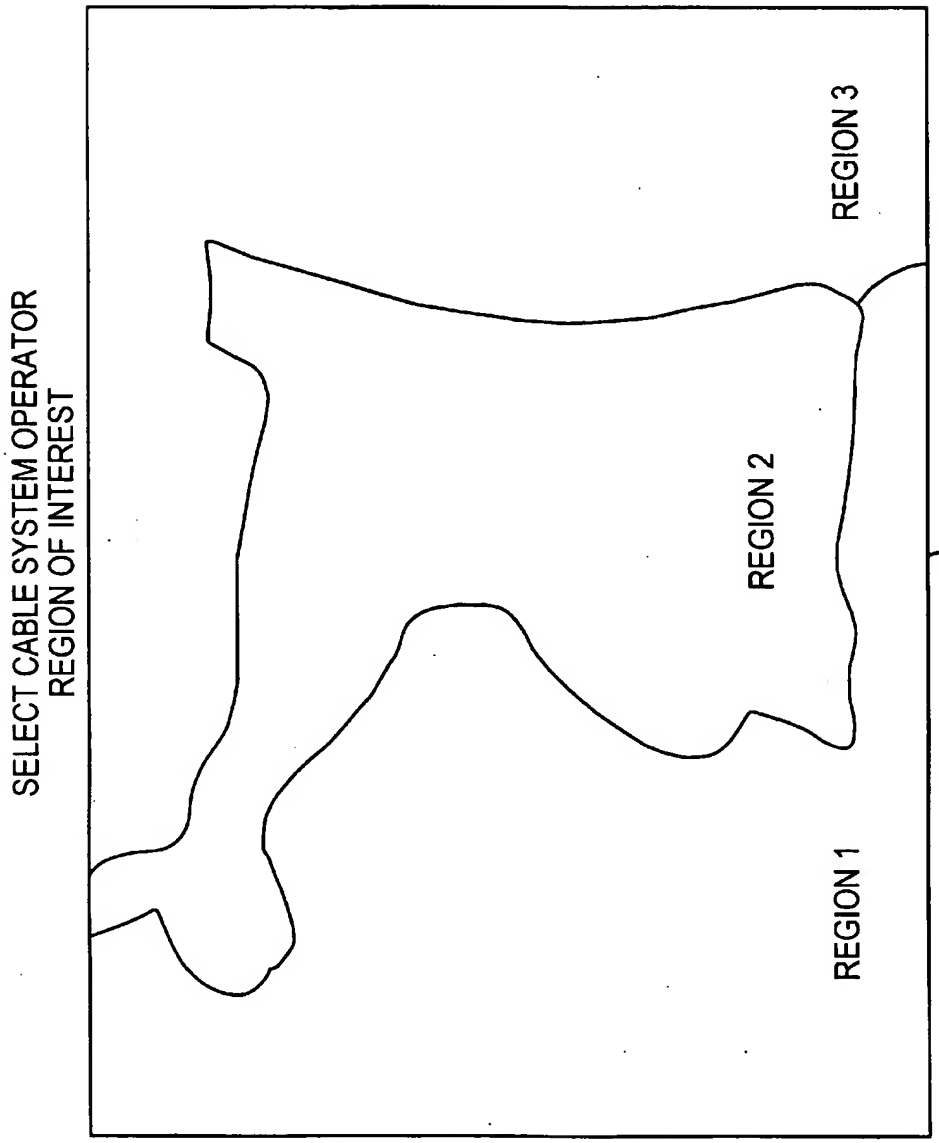

SELECT CABLE SYSTEM OPERATOR
REGION OF INTEREST
REGION 3
REGION 2
REGION 1
306

FIG. 4

FIG. 5

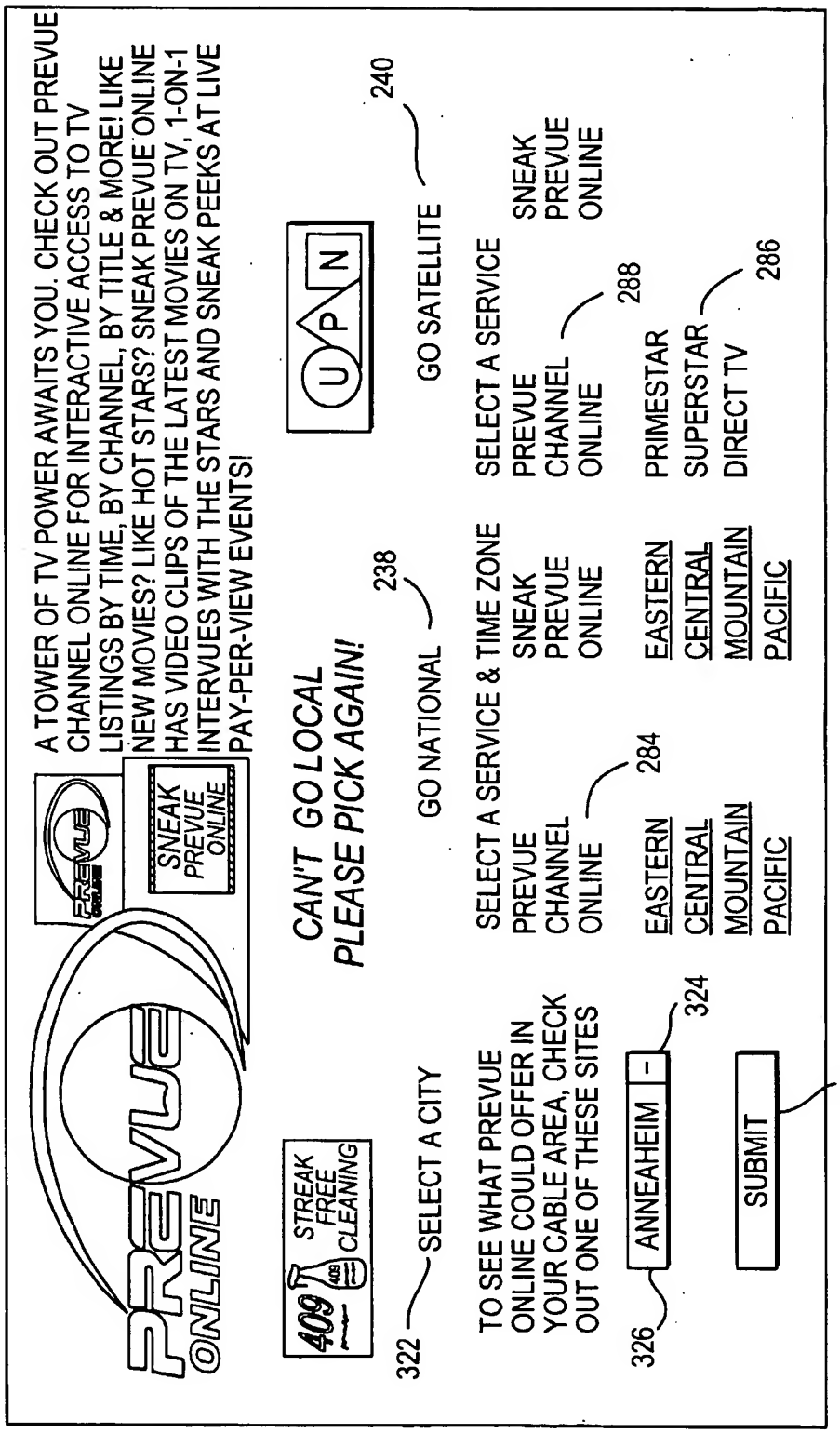
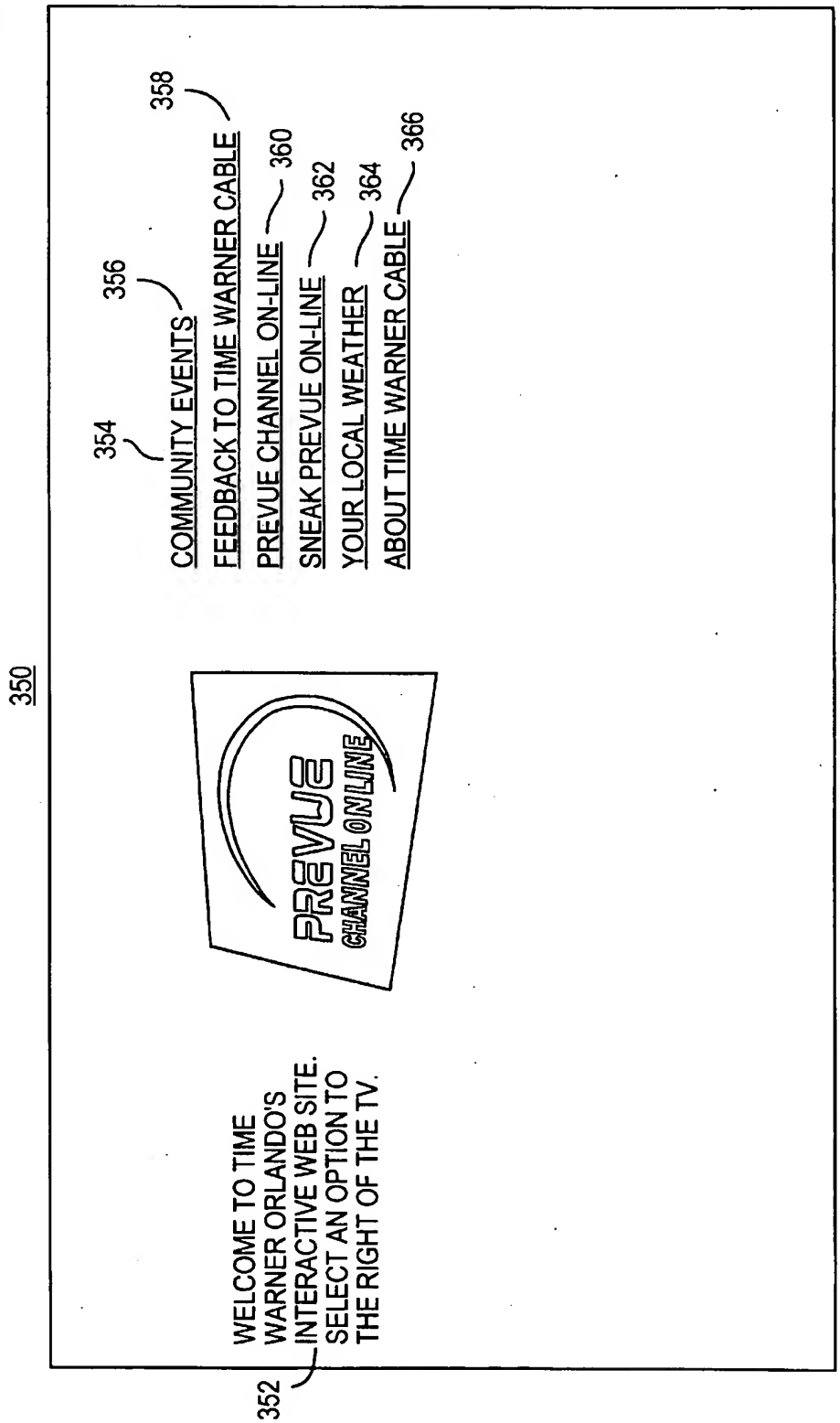

320
A TOWER OF TV POWER AWAITS YOU. CHECK OUT PREVUE CHANNEL ONLINE FOR INTERACTIVE ACCESS TO TV LISTINGS BY TIME, BY CHANNEL, BY TITLE & MORE! LIKE NEW MOVIES? LIKE HOT STARS? SNEAK PREVUE ONLINE HAS VIDEO CLIPS OF THE LATEST MOVIES ON TV, 1-ON-1 INTERVUES WITH THE STARS AND SNEAK PEEKS AT LIVE PAY-PER-VIEW EVENTS!
PREVUE ONLINE
SNEAK PREVUE ONLINE
409 STREAK FREE CLEANING
CAN'T GO LOCAL
PLEASE PICK AGAIN!
238
GO NATIONAL
240
GO SATELLITE
UPN
322
SELECT A CITY
SELECT A SERVICE & TIME ZONE
PREVUE CHANNEL ONLINE
284
SNEAK PREVUE ONLINE
EASTERN
CENTRAL
MOUNTAIN
PACIFIC
SELECT A SERVICE
PREVUE CHANNEL ONLINE
288
SNEAK PREVUE ONLINE
PRIMESTAR
SUPERSTAR
DIRECT TV
286
TO SEE WHAT PREVUE ONLINE COULD OFFER IN YOUR CABLE AREA, CHECK OUT ONE OF THESE SITES
326
ANNEAHEIM
324
SUBMIT
330

FIG. 6


350
352
354
356
358
360
362
364
366
COMMUNITY EVENTS
FEEDBACK TO TIME WARNER CABLE
PREVUE CHANNEL ON-LINE
SNEAK PREVUE ON-LINE
YOUR LOCAL WEATHER
ABOUT TIME WARNER CABLE
PREVUE
CHANNEL ONLINE
WELCOME TO TIME WARNER ORLANDO'S INTERACTIVE WEB SITE. SELECT AN OPTION TO THE RIGHT OF THE TV.

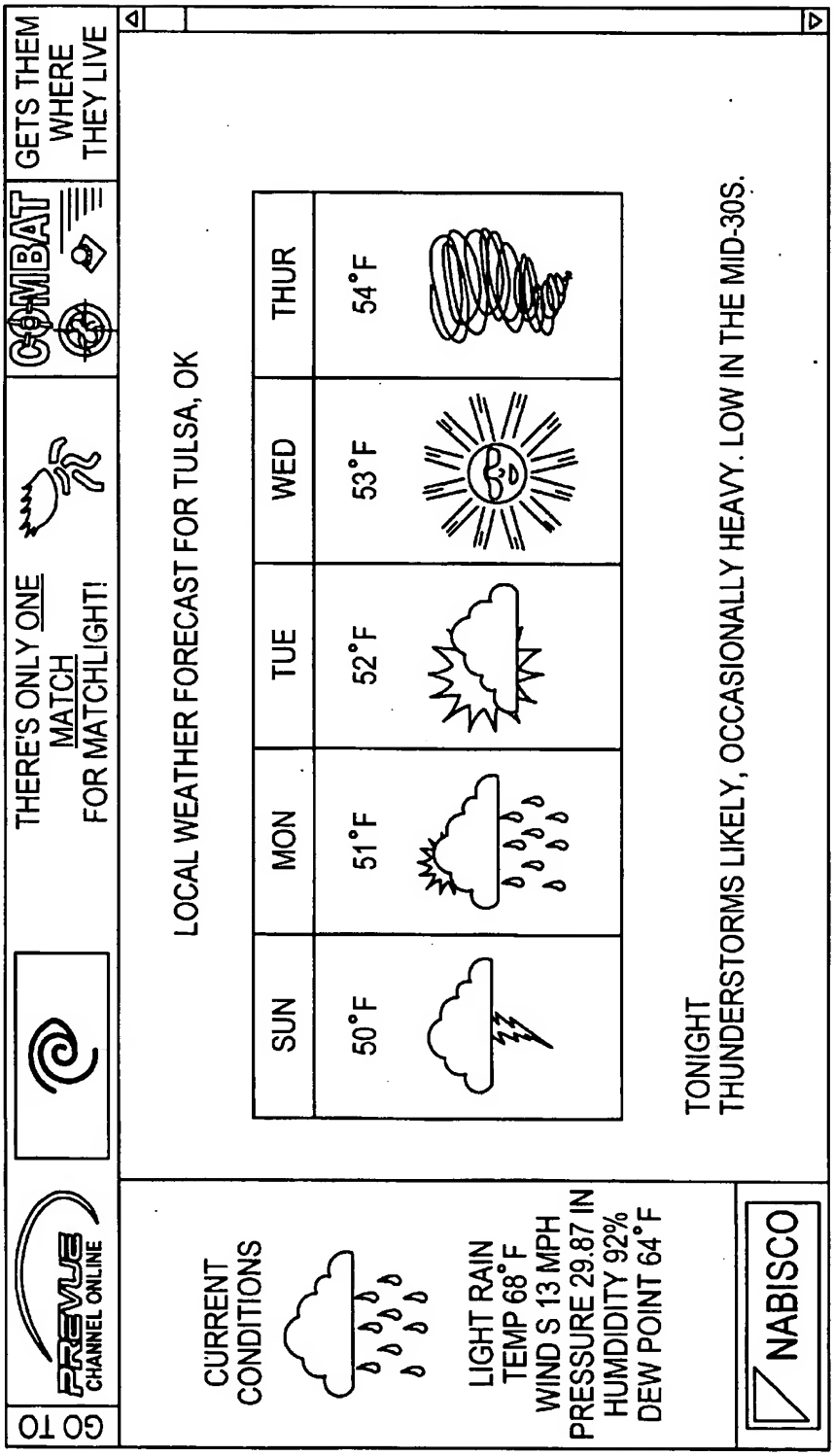

400
GO TO
PREVUE CHANNEL ONLINE
THERE'S ONLY ONE MATCH FOR MATCHLIGHT!
COMBAT
GETS THEM WHERE THEY LIVE
LOCAL WEATHER FORECAST FOR TULSA, OK
SUN
MON
TUE
WED
THUR
50°F
51°F
52°F
53°F
54°F
CURRENT CONDITIONS
LIGHT RAIN
TEMP 68°F
WIND S 13 MPH
PRESSURE 29.87 IN
HUMIDITY 92%
DEW POINT 64°F
TONIGHT
THUNDERSTORMS LIKELY, OCCASIONALLY HEAVY. LOW IN THE MID-30S.
NABISCO

FIG. 7

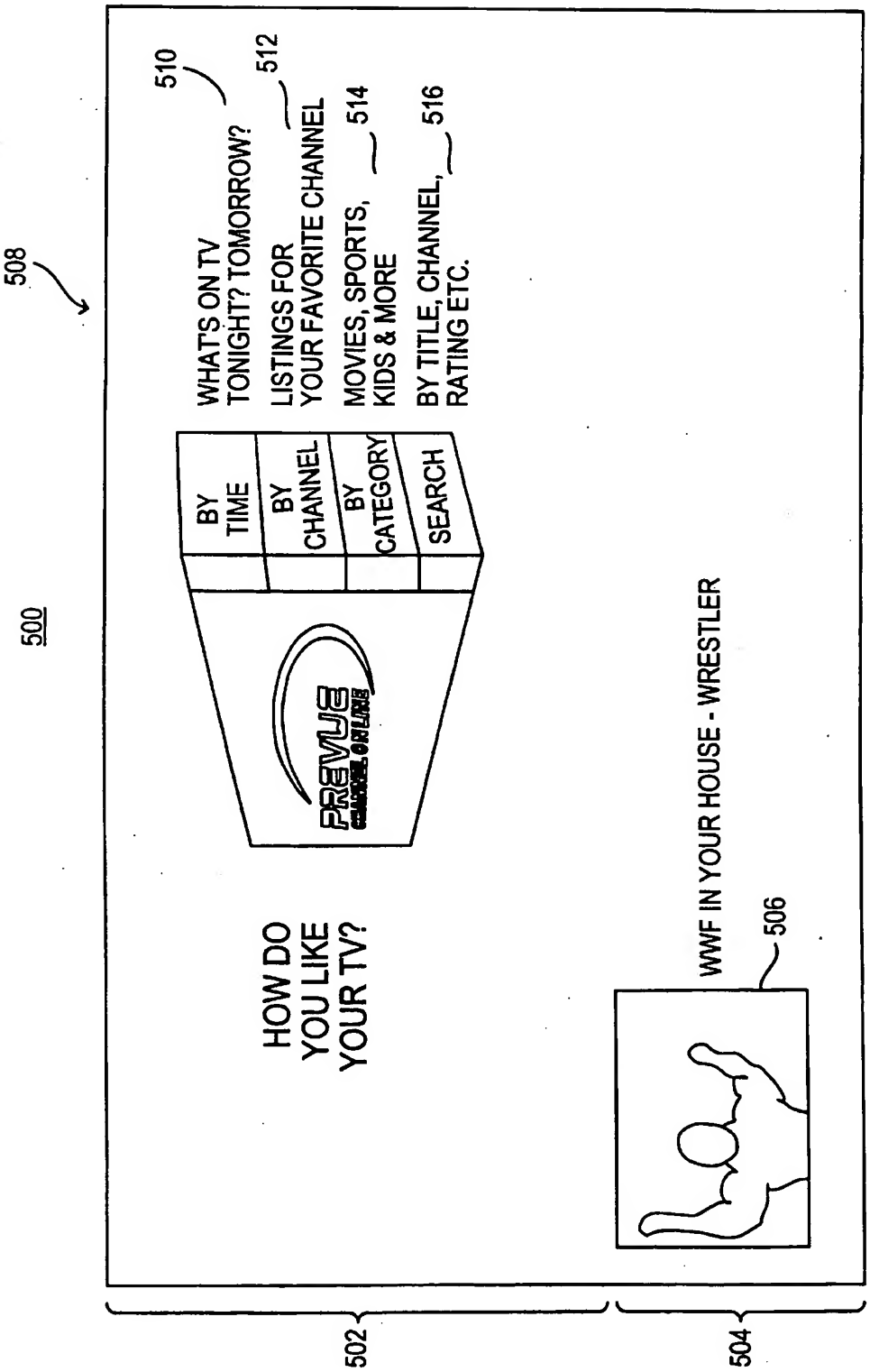

500
502
504
508
510
512
514
516
506
WHAT'S ON TV TONIGHT? TOMORROW?
LISTINGS FOR YOUR FAVORITE CHANNEL
MOVIES, SPORTS, KIDS & MORE
BY TITLE, CHANNEL, RATING ETC.
BY TIME
BY CHANNEL
BY CATEGORY
SEARCH
PREVUE
HOW DO YOU LIKE YOUR TV?
WWF IN YOUR HOUSE - WRESTLER

FIG. 8

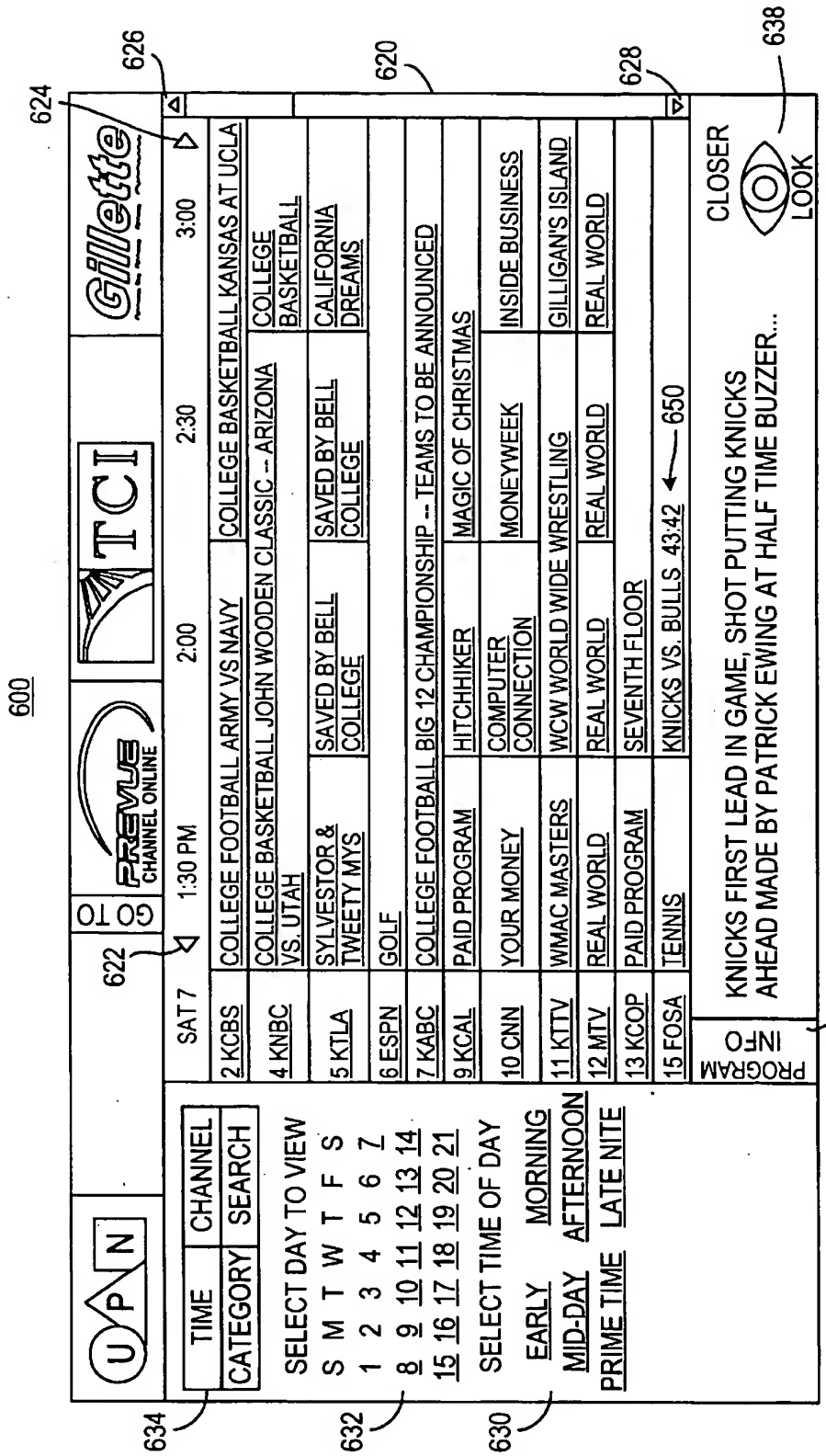

600
624
626
620
628
638
622
634
632
630
636
650
UPN
TCI
Gillette
PREVUE CHANNEL ONLINE
GO TO
SAT 7
1:30 PM
2:00
2:30
3:00
2 KCBS
4 KNBC
5 KTLA
6 ESPN
7 KABC
9 KCAL
10 CNN
11 KTTV
12 MTV
13 KCOP
15 FOSA
COLLEGE FOOTBALL ARMY VS NAVY
COLLEGE BASKETBALL JOHN WOODEN CLASSIC -- ARIZONA VS. UTAH
COLLEGE BASKETBALL KANSAS AT UCLA
SYLVESTOR & TWEETY MYS
SAVED BY BELL COLLEGE
SAVED BY BELL COLLEGE
CALIFORNIA DREAMS
GOLF
COLLEGE FOOTBALL BIG 12 CHAMPIONSHIP -- TEAMS TO BE ANNOUNCED
PAID PROGRAM
HITCHHIKER
MAGIC OF CHRISTMAS
YOUR MONEY
COMPUTER CONNECTION
MONEYWEEK
INSIDE BUSINESS
WMAC MASTERS
WCW WORLD WIDE WRESTLING
GILLIGAN'S ISLAND
REAL WORLD
REAL WORLD
REAL WORLD
REAL WORLD
PAID PROGRAM
SEVENTH FLOOR
TENNIS
KNICKS VS. BULLS 43:42
PROGRAM INFO
KNICKS FIRST LEAD IN GAME, SHOT PUTTING KNICKS AHEAD MADE BY PATRICK EWING AT HALF TIME BUZZER...
CLOSER LOOK
TIME
CHANNEL
CATEGORY
SEARCH
SELECT DAY TO VIEW
S M T W T F S
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
SELECT TIME OF DAY
EARLY MORNING
MID-DAY AFTERNOON
PRIME TIME LATE NITE

FIG. 9

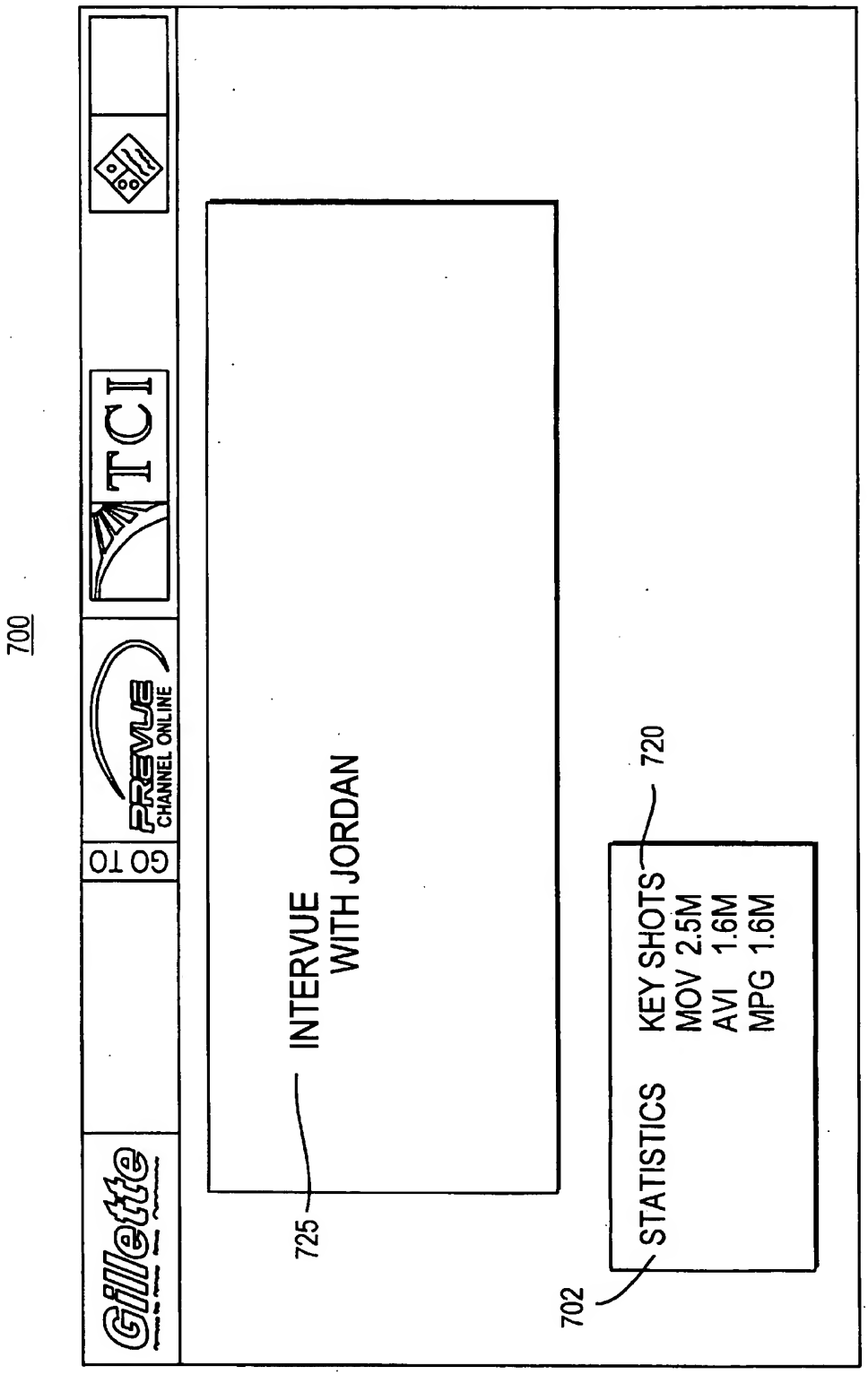

700
Gillette
GO TO
PREVUE CHANNEL ONLINE
TCI
INTERVUE
WITH JORDAN
725
STATISTICS
KEY SHOTS
MOV 2.5M
AVI 1.6M
MPG 1.6M
720
702

FIG. 10

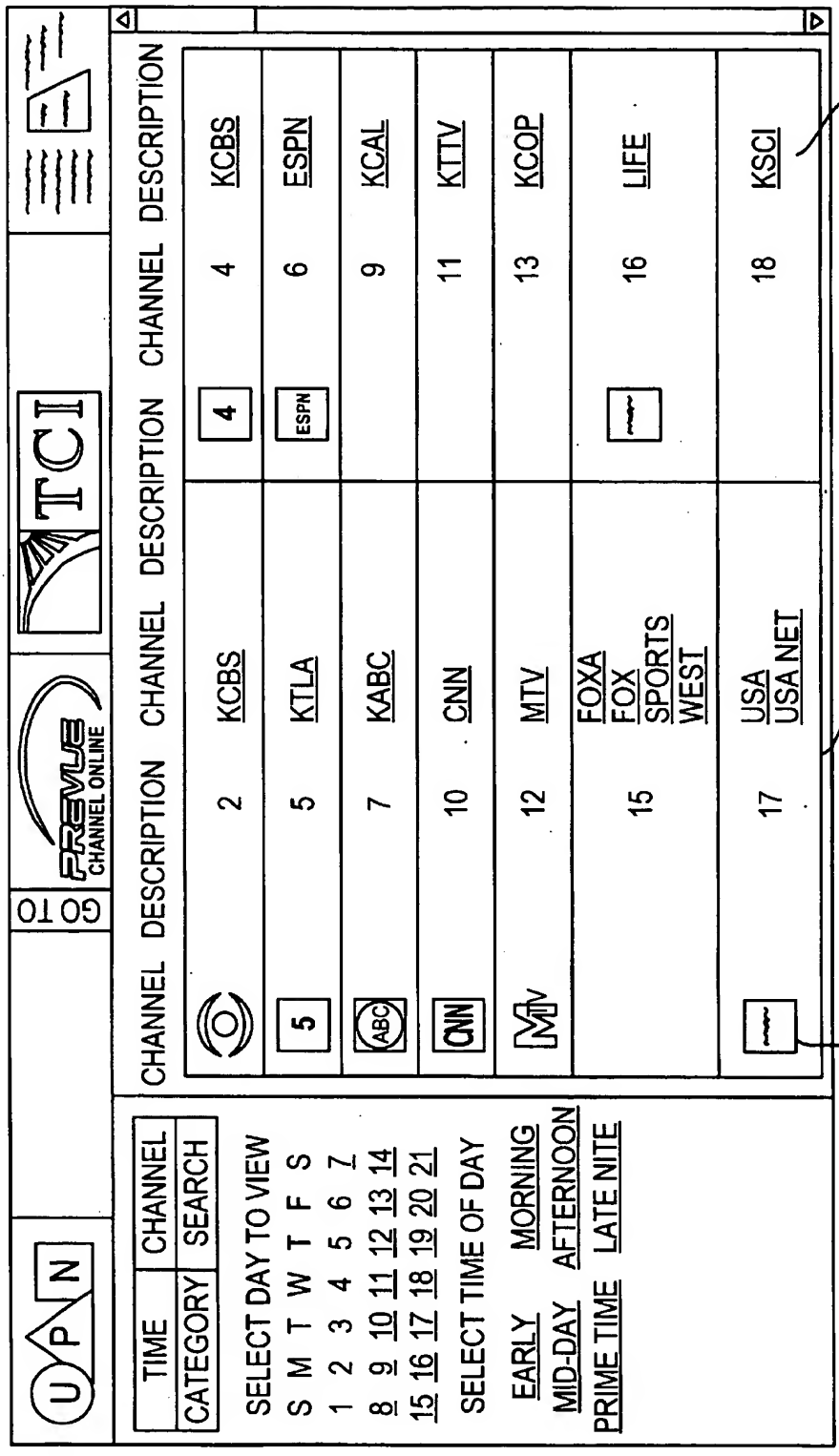

760
UPN
GO TO
PREVUE CHANNEL ONLINE
TCI
TIME
CHANNEL
CATEGORY
SEARCH
SELECT DAY TO VIEW
S M T W T F S
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
SELECT TIME OF DAY
EARLY MORNING
MID-DAY AFTERNOON
PRIME TIME LATE NITE
CHANNEL DESCRIPTION CHANNEL DESCRIPTION CHANNEL DESCRIPTION
2 KCBS
5 KTLA
7 KABC
10 CNN
12 MTV
15 FOXA FOX SPORTS WEST
17 USA USA NET
4 KCBS
6 ESPN
9 KCAL
11 KTTV
13 KCOP
16 LIFE
18 KSCI
762
764
766

FIG. 11

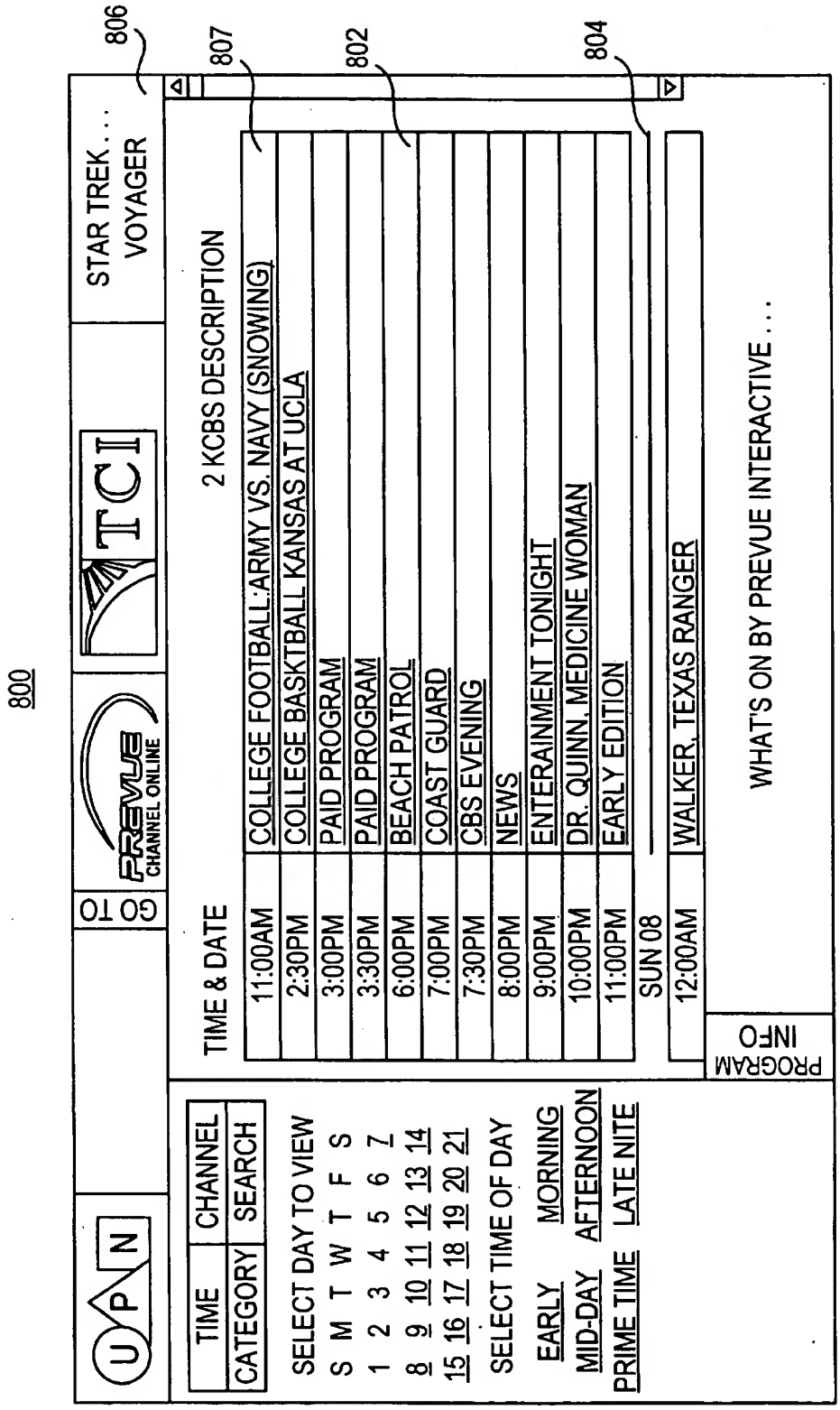

800
806
807
802
804
STAR TREK... VOYAGER
TCI
PREVUE CHANNEL ONLINE
GO TO
UPN
2 KCBS DESCRIPTION
TIME & DATE
11:00AM COLLEGE FOOTBALL:ARMY VS. NAVY (SNOWING)
2:30PM COLLEGE BASKTBALL KANSAS AT UCLA
3:00PM PAID PROGRAM
3:30PM PAID PROGRAM
6:00PM BEACH PATROL
7:00PM COAST GUARD
7:30PM CBS EVENING
8:00PM NEWS
9:00PM ENTERAINMENT TONIGHT
10:00PM DR. QUINN, MEDICINE WOMAN
11:00PM EARLY EDITION
SUN 08
12:00AM WALKER, TEXAS RANGER
PROGRAM INFO
WHAT'S ON BY PREVUE INTERACTIVE...
TIME
CHANNEL
CATEGORY
SEARCH
SELECT DAY TO VIEW
S M T W T F S
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
SELECT TIME OF DAY
EARLY MORNING
MID-DAY AFTERNOON
PRIME TIME LATE NITE

FIG. 12

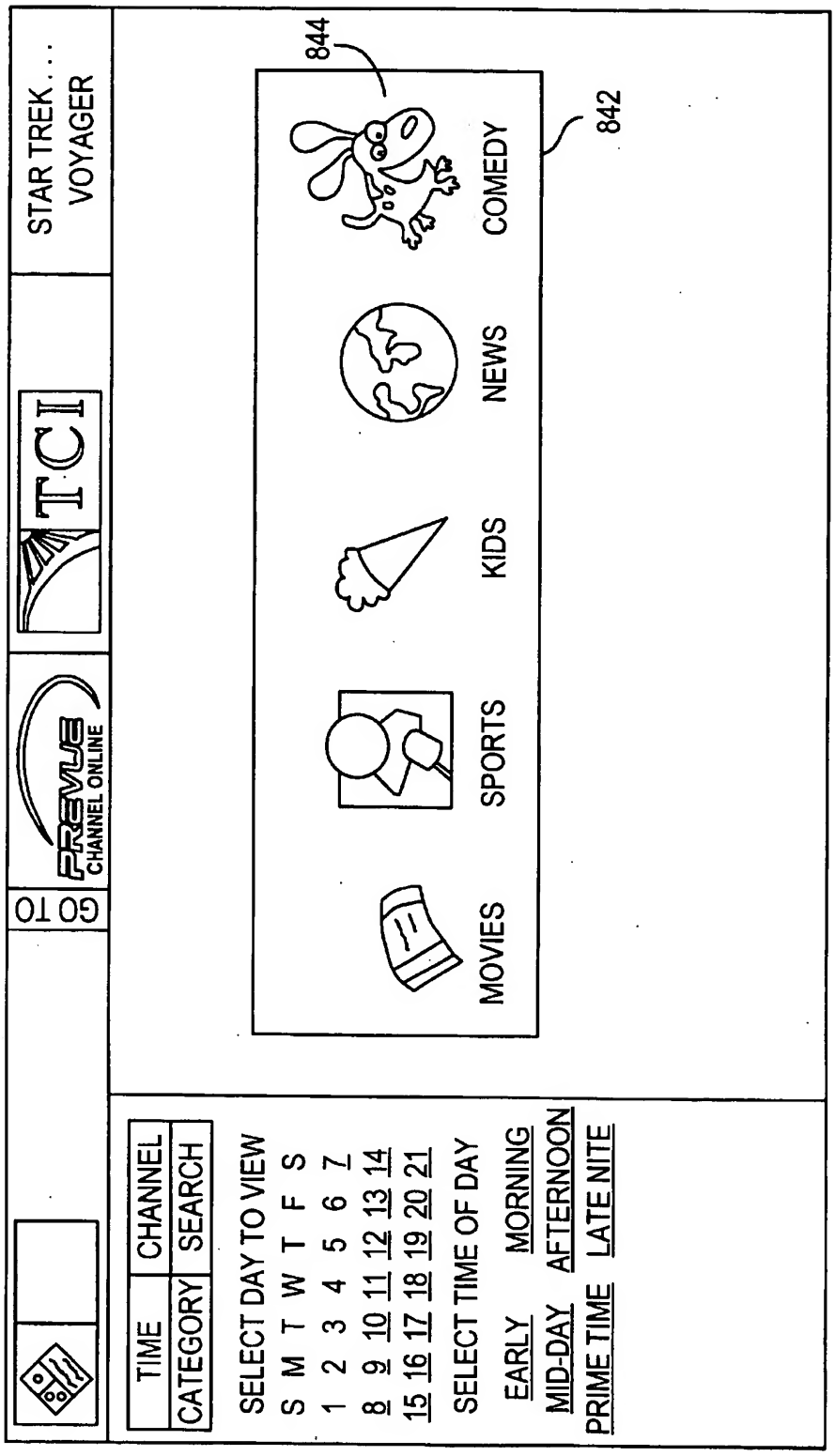

840
GO TO
PREVUE CHANNEL ONLINE
TCI
STAR TREK....
VOYAGER
844
842
MOVIES
SPORTS
KIDS
NEWS
COMEDY
TIME
CHANNEL
CATEGORY
SEARCH
SELECT DAY TO VIEW
S M T W T F S
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
SELECT TIME OF DAY
EARLY MORNING
MID-DAY AFTERNOON
PRIME TIME LATE NITE

FIG. 13

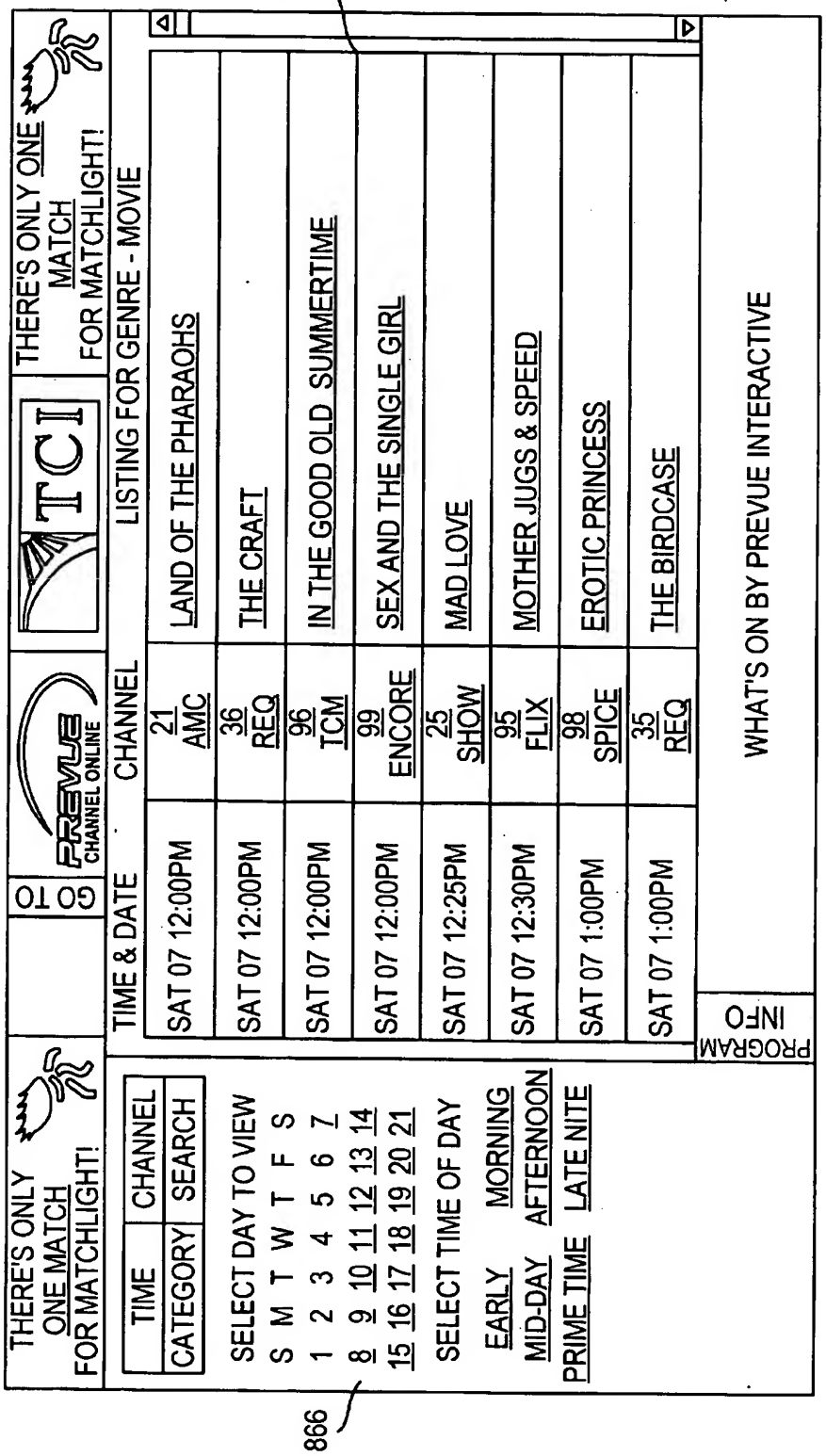

860
862
866
THERE'S ONLY ONE MATCH FOR MATCHLIGHT!
GO TO PREVUE CHANNEL ONLINE
TCI
THERE'S ONLY ONE MATCH FOR MATCHLIGHT!
TIME
CHANNEL
CATEGORY
SEARCH
SELECT DAY TO VIEW
S M T W T F S
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
SELECT TIME OF DAY
EARLY MORNING
MID-DAY AFTERNOON
PRIME TIME LATE NITE
TIME & DATE
CHANNEL
LISTING FOR GENRE - MOVIE
SAT 07 12:00PM 21 AMC LAND OF THE PHARAOHS
SAT 07 12:00PM 36 REQ THE CRAFT
SAT 07 12:00PM 96 TCM IN THE GOOD OLD SUMMERTIME
SAT 07 12:00PM 99 ENCORE SEX AND THE SINGLE GIRL
SAT 07 12:25PM 25 SHOW MAD LOVE
SAT 07 12:30PM 95 FLIX MOTHER JUGS & SPEED
SAT 07 1:00PM 98 SPICE EROTIC PRINCESS
SAT 07 1:00PM 35 REQ THE BIRDCASE
PROGRAM INFO
WHAT'S ON BY PREVUE INTERACTIVE

FIG. 14

INTERNET TELEVISION PROGRAM GUIDE SYSTEM WITH EMBEDDED REAL-TIME DATA

BACKGROUND OF THE INVENTION

This invention relates to the Internet, and more particularly, to techniques for providing television program guide information and services with embedded real-time data to a user over the Internet.

A large number of television channels are available over cable television systems and satellite television systems. Television viewers have traditionally had to consult pre-printed television program listings to determine which programs were scheduled to be broadcast on a particular day. More recently, television-based program guides have been developed that allow television viewers to view television program listings directly on their television sets.

For example, the Prevue® channel is a scrolling television program listings service that a cable system operator may make available to subscribers over a dedicated cable channel. Viewers can tune to the appropriate television channel to view program listings for television programs that are currently being broadcast and are scheduled to be broadcast in the next few hours. Although the Prevue® channel is a valuable service, the viewer is somewhat constrained by the passive nature of the service. For example, the viewer cannot view television listings for the next day or week.

As a result, more advanced television program guide services have been developed that allow a service provider to deliver television program listings data to a user's set-top box. The program listings data is typically delivered over the television cable system infrastructure (e.g., on a given television channel during the vertical blanking interval or over an out-of-band channel). Software in the set-top box allows the user to display the television program listings on the user's television set.

These program guide services allow the user to manipulate the television listings by searching or sorting through the listings using criteria such as genre, channel, and broadcast time. An example of such an interactive television program guide is the Prevue Express® guide of Prevue Networks, Inc. of Tulsa, Okla., the assignee of the present invention.

Although passive scrolling guides and interactive set-top box guides are useful sources of television program guide information, millions of users with personal computers were not able to obtain on-line television program listings using such systems. In addition, users were not generally able to view selected promotional video clips, interview segments, audio clips, or other multimedia material related to a given television program.

In order to meet these demands, television program guide systems that provide television program listings from a web server to a user's multimedia system over an Internet communication link were developed. For example, the Prevue Online® service available on the Internet at http://www.prevue.com from Prevue Networks, Inc. of Tulsa, Okla., the assignee of the present invention, provides television program listings over an Internet communication link. Users can gain access to the Prevue Online® web site on the Internet through any Internet service provider (such as through the WorldNet™ service available from American Telephone and Telegraph Company of New York, N.Y.). Once at the home page of the Prevue Online® service, the user may access information using commonly available web browser software.

Although Internet television program guide systems that provide television program listings from a web server to a user's multimedia system over an Internet communications link are useful sources of television program guide information, the user is somewhat constrained by the static nature of the information available. The user is able to determine from the television program listings that an event (e.g., a sporting event or other game) is in progress, but the user cannot view the current status of the event. For example, the user cannot receive real-time information about whether a game is suspended, whether the game is in overtime, the current score, etc.

It is therefore an object of the present invention to provide a television program guide system that provides television program listings with embedded real-time data from a web server to a user's multimedia system over an Internet communications link.

It is a further object of the present invention to provide a television program guide system that allows users to click on text or still images to view additional information related to the embedded real-time data.

SUMMARY OF THE INVENTION

These and other objects of the invention are accomplished in accordance with the principles of the present invention by providing an Internet television program guide system, that displays television program listings with embedded real-time data. A computer system having a media library and a data server is used to provide multimedia clips and related television program guide data for the system. The multimedia material and related television program guide data may be provided to a web server for redistribution to a user's personal computer or other suitable multimedia system.

Dynamic information regarding events in progress that are being televised may be provided to the web server from one or more information processing facilities. Such dynamic information may be linked with related static information in the media library and/or the data server to provide the user with additional information pertaining to the events in progress. The web server provides the static and dynamic information to the user's multimedia system via an Internet communications link.

The user's multimedia system has a processing unit for receiving and processing information from the Internet communications link. The processing unit may be based on a personal computer running a standard web browser with plug-ins. The multimedia system may also have the capability to receive television signals.

Television program listings with embedded real-time data are preferably provided to the user's multimedia system in the form of web pages. Because such an arrangement allows the use of the widely-adopted hypertext transfer protocol (http), a user with a personal computer can access information using commonly available web browser software. Because television program listings with embedded real-time data are distributed over the Internet, the user can access this information at remote locations. For example, the user can access the television program listings with embedded real-time data while traveling by car (e.g., using a cellular modem), from a hotel room or business meeting, from a personal computer at work, or in any suitable environment in which there is a link to the Internet. The user can receive this dynamic information from locations not covered by cable or satellite systems or locations where the user may not have access to cable or satellite service.

Because the Internet television program guide system with embedded real-time data may be provided using a web

site having a number of linked web pages, supplemental information related to the embedded real-time data can be provided to the user. Such supplemental information might include statistics pertaining to the teams and/or specific athletes that are participating in a game. The supplemental information may be provided using any suitable media format such as animation, full motion video, sound, still images, or text.

Further features of the invention, its nature and various advantages will be more apparent from the accompanying drawings and the following detailed description of the preferred embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic diagram showing how a media library, data server, and data inputs from information processing facilities may be interconnected with a web server and various multimedia systems in accordance with the present invention.

FIG. **2** is an illustrative display containing a home page for an Internet television program guide system with embedded real-time data in accordance with the present invention.

FIG. **3** is an illustrative display containing a map-based menu for identifying a geographical area of interest in accordance with the present invention.

FIG. **4** is an illustrative display containing a map-based menu for a smaller geographical area than the area shown in FIG. **3**.

FIG. **5** is an illustrative display of a menu offering access to various types of program listings as alternatives to access to local program listings in accordance with the present invention.

FIG. **6** is an illustrative display presenting various program guide options to the user in accordance with the present invention.

FIG. **7** is an illustrative display containing weather information.

FIG. **8** is an illustrative display presenting various program guide options related to the way in which television program guide listings are organized on the user's display screen in accordance with the present invention.

FIG. **9** is an illustrative display containing television program guide listings organized by time in accordance with the present invention.

FIG. **10** is an illustrative display of information on an event selected by the user and related options in accordance with the present invention.

FIG. **11** is an illustrative display presenting a menu of channel selections in accordance with the present invention.

FIG. **12** is an illustrative display containing television program guide listings organized by channel in accordance with the present invention.

FIG. **13** is an illustrative display containing icons representing category options in accordance with the present invention.

FIG. **14** is an illustrative display containing television program guide listings organized by category in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

An Internet television program guide system **8** for providing television program listings with embedded real-time data in accordance with the present invention is shown in FIG. **1**. Television program information is stored in media library **12** and data server **14** of main facility **10**. Media library **12** preferably contains an array of compact disc read only memory (CD-ROM) disks, digital video disks (DVDs), or other suitable media for storing multimedia content. Media library **12** contains television program clips and related interviews and reviews. Media library **12** may also contain video clips and related interviews and reviews from previously televised sporting events. The television program information stored in media library **12** is primarily video information.

Data server **14** maintains various databases of television program information. For example, data server **14** maintains a television program listings database. Data server **14** may also have a remote media database containing descriptions of the videos in media library **12**. In addition, data server **14** may have a database containing statistical information on various sports teams (e.g., National Football League teams, National Hockey League teams, National Basketball Association teams, etc.), as well as information on the players of each team. Data server **14** may have a cable system operator database containing channel lineups, information on the time zone of the operator, weather data for the operator's region, data on the zip codes in the cable system operator's area, etc. Other databases may be supported by data server **14** if desired. The television program information in data server **14** is primarily in non-video formats.

Media library **12** and data server **14** may be interconnected with transmission server **16** via internal network **18**. In addition to information received from media library **12** and data server **14**, transmission server **16** receives information from one or more real-time data processing facilities **20, 22, 24** and **26** via network links **30** and **32** and/or via satellite links **34** and **36**. Media library **12**, data server **14**, network **18**, and transmission server **16** including its links make up computer system **100**. Television program information may be stored on data server **14** in a relational database format and may be stored on transmission server **16** in an object-oriented database format. A building process implemented in the C++ programming language can be used to periodically build a temporary data set of television program information (e.g., a seven-day to one-month data set) for storage on transmission server **16**.

Transmission server **16** receives dynamic or real-time data to be displayed with a corresponding program listing for an event in progress that is being televised or with any other program listing to which the real-time data is of relevance. Such real-time data may include weather data, sports scores, video stills, video and audio clips, interview segments, etc. The real-time data received by transmission server **16** from processing facilities **50** is embedded within the television program listing of the corresponding televised event in progress or within any other program listing to which the real-time data is of relevance. For example, if transmission server **16** receives real-time data from information processing facility **22** such as the score in a basketball game being played between the New York Knicks and the Chicago Bulls that is being televised on the MSG channel, the current score of the game is embedded within the row of text of the corresponding television program listing which indicates that the New York Knicks v. Chicago Bulls game is being televised on MSG from 8:00 P.M. EST to 11:30 P.M. EST. Similarly, real-time data pertaining to the weather may be embedded within the program listing of an outdoor event such as a marathon, which may be in progress and being televised or which may be scheduled to be televised in the near future.

Television program information including television program listings information and related real-time data may be transferred from transmission server **16** to web server **55** via communications line **52**. Communications line **52** may be part of an internal network or may be a standard dedicated communications line. Data may also be transferred from transmission server **16** to web server **55** via satellite. Web server **55** can be connected to the Internet **60** via communications link **56**. Communications link **56** is preferably a telephone network link or other suitable Internet communications path.

If transmission server **16** and web server **55** are separate devices, as shown in FIG. **1**, transmission server **16** can be used as a common data processing facility for other applications which use the type of data stored on transmission server **16**. If desired, the functions of transmission server **16** and web server **55** can be integrated in a single machine. Similarly data server **14** and transmission server **16** can be integrated in a single machine with separate logical functionalities.

Web server **55** uses a standard protocol such as the TCP/IP (Transmission Control Protocol/Internet Protocol) and hypertext transfer protocol to make television program information available over the Internet **60** to users at multimedia systems **70**, **72**, **74**, and **76** via communication links **62**, **64**, **66**, and **68**, respectively. Communication links **62**, **64**, **66**, and **68** are Internet links formed from telephone lines, radio-frequency (RF) links, cable modem links, satellite dish links, combinations of links such as these, or any other suitable Internet connection paths.

Multimedia systems **70**, **72**, and **74** may be standard modern laptops, notebooks, or desktop computers with multimedia and Internet capabilities. Multimedia system **76** uses an integrated personal computer and television **78**, such as the Gateway 2000 Destination® PC-TV hybrid available from Gateway 2000 Inc. of North Sioux City, S. Dak. Television signals are provided at input **80**. Internet access is provided via Internet communications link **68**.

During operation of system **100**, certain data processing functions, such as user-initiated searches and sorts, may be performed on web server **55**. If desired, such functions can be performed on a suitable data processing component in one of multimedia systems **70**, **72**, **74**, or **76**.

Regardless of the specific configuration of the multimedia systems used in the system of FIG. **1**, the user of such a multimedia system has the capability to access an interactive Internet television program guide having embedded real-time data within its program listings using web server **55**. The features of the program guide are available using the personal computer functions of the user's multimedia system. If it is desired to use certain program guide features that rely upon the control of a tuner or recording unit, the multimedia system should also have the ability to tune to a desired television program from among the various television programs provided at input **80** and have the ability to record that program automatically, under the control of commands from a built-in processing unit.

The system hardware shown in FIG. **1** is illustrative and other suitable hardware arrangements may be used if desired. Regardless of the particular hardware system that is used, however, the present invention preferably provides the television program guide to users over the Internet in the form of multiple web pages that use the standard hypertext transfer protocol (http). In the system of FIG. **1**, web pages and associated program guide features (such as searching, etc.) are provided using web server **55**.

Because the television program guide is provided using web pages, the features of the program guide may be accessed using standard web browsers operating on the appropriate processing unit in the user's multimedia system. For example, in multimedia system **72** of FIG. **1**, a web browser may be implemented using the computer's built-in processing unit. Suitable web browsers include the Internet Explorer® web browser of Microsoft Corporation of Redmond, Wash. and the Netscape Navigator® web browser of Netscape Communications Corporation of Mountain View, Calif. Such web browsers support the viewing of various types of multimedia content, such as video stills (JPEG or GIF files) and video and audio clips (AVI, MOV, and MPG files). If desired, certain of these multimedia support functions may be provided as web browser plug-ins (i.e., special software modules designed to enhance the features of a web browser application). A suitable video player plug-in for MOV files is the Quicktime® application of Apple Computer, Inc. of Cupertino, Calif. AVI and MPG (or MPEG—Motion Picture Expert Group) files may be played using the ActiveMovie® application of Microsoft Corporation.

An illustrative welcome page **200** for the television program guide of the present invention is shown in FIG. **2**. Web browser function keys **226** help the user to navigate through web pages of material such as welcome page **200**. Users may also navigate by clicking on an image or an element of highlighted text with cursor **242**, which may be controlled by a pointing device such as a mouse or trackball. Other arrangements for selecting links may be used if desired. Web browser function keys **226** include back and forward keys that allow the user to navigate backward and forward along a browsing trail. Web browser function keys **226** are not shown in the other drawings, but are shown in FIG. **2** to illustrate the types of function keys that are available with a standard web browser.

Welcome page **200** may contain identifying logos **228**. Identifying logos **228** allow a user to quickly associate a service provider with the Internet television program guide service. If desired, welcome page **200** can contain summary instructions **230** that inform the user of some of the features available with the guide. The summary instructions **230** may, for example, inform the user that the guide provides embedded real-time data within the program listings of televised events in progress. Other web pages (not shown) may contain links that point to welcome page **200**.

An important aspect of the Internet television program guide provided by system **8** (FIG. **1**) relates to providing on-line television program listings that contain real-time data on televised events in progress. The user may be presented with a number of choices regarding the type of on-line program listings that are available. In addition, the user may be provided with an opportunity to access supplemental real-time information on the events in progress based on the program listings the user displays. For example, the user may be presented with the opportunity to select between go local option **236**, go national option **238**, and go satellite option **240**. After the user has selected one of these options, the user may access dynamic information pertaining to events in progress which are being televised and thus appear in the program listings for the option chosen by the user.

If the user desires to select go local option **236**, the user may be prompted to enter a zip code for the local area of interest in box **244**. If service is available, the program guide system presents the user with information for an appropriate local system operator's television lineup based on the zip

code information. If the user is unaware of the zip code of the region where the event in progress is being televised, the user can select a local area by entering information such as a cable system operator's name, the name of a city, international country and city information, etc. Another way in which the user may select a local service area of interest is using a map-based graphical user interface. As shown in FIG. **3**, the user is presented with United States map **302**. The user selects a state of interest using cursor **304**. If necessary, additional maps containing greater levels of detail are provided, each allowing the user to make further geographical selections. Ultimately, the user is presented with a local map (e.g., a map that allows the user to select from several available cable system operators). In map **306** of FIG. **4**, the user can select between three available cable system operator regions: region **1**, region **2**, and region **3**.

If no local service is available, the user may be provided with pick again page **320** as shown in FIG. **5**. Pick again page **320** provides the user with another opportunity to select go national option **238** or go satellite option **240**. In addition, pick again page **320** provides the user with select a city option **322**, which is associated with a less restrictive set of program information than go local option **236** (FIG. **2**). With select a city option **322**, the user may select a desired city where the event in progress is being televised using arrow key **324** (or alternatively, could type the name of the city directly into box **326**). After entering the desired city, the city information is submitted to the system by clicking on submit button **330**. Because select a city option **322** is less localized than go local option **236**, choosing select a city option **322** makes it more likely that there will be a set of program listings available for the user.

If service is available for the user in either the city selected in city option **322** or the localized geographic area selected in go local option **236**, the user is presented with local cable site page **350** of FIG. **6**, which is customized to reflect the local geographic area or city selected by the user. Local cable site page **350** may contain a welcome message **352** that is customized to reflect the name of the local cable system operator.

A number of options **354** may be presented as hypertext links to associated web pages. An image **356** is displayed that changes as the user places cursor **242** (FIG. **2**) on top of each option **354**. For example, the image **356** of FIG. **6** is presented when the user positions cursor **242** over program guide option **360**. Different images are displayed as cursor **242** passes over each option **354**. The images **356** to be displayed may be stored as bitmap images. This technique of presenting context-sensitive images to illustrate the current position of the cursor over hypertext link options is preferably used throughout the Internet television program guide service.

Various web pages may be displayed depending on which option **354** is selected by the user. For example, an option **354** that is available on local cable site page **350** (FIG. **6**) is local weather option **364**. Selecting local weather option **364** takes the user to local weather page **400** (FIG. **7**). If desired, a map-based menu (such as shown in FIGS. **3** and **4**) or other user input arrangement can be used to provide the user with the opportunity to select additional cities for which weather information is desired.

Program guide option **360** allows the user to access television program listings that can be organized by time, channel, and category and can be searched. Selecting program guide option **360** takes the user to program guide menu page **500** (FIG. **8**). The user may reach program guide menu page **500** (FIG. **8**) from go national option **238** (FIGS. **2** and **5**) or go satellite option **240** (FIGS. **2** and **5**). If the user selected go local option **236** (FIG. **2**), the user may reach program guide menu page **500** (FIG. **8**) by selecting program guide option **360** on local cable site page **350** (FIG. **6**). The user may also reach program guide menu page **500** (FIG. **8**) via select a city option **322** (FIG. **5**). Each of these paths to program guide menu page **500** requires that slightly different user selections be made.

Go local option **236** (FIG. **2**) requires that a user specify a particular local region (or cable system operator) of interest to reach local cable site page **350** (FIG. **6**). To reach program guide menu page **500** (FIG. **8**) from local cable site page **350** (FIG. **6**), the user selects program guide option **360**.

Go national option **238** (FIGS. **2** and **5**) requires that a user select a desired time zone (e.g., eastern, central, mountain, or pacific). To reach program guide menu page **500** from welcome page **200** (FIG. **2**) or pick again page **320** (FIG. **5**), the user selects program guide option **284**.

Go satellite option **240** (FIGS. **2** and **5**) requires that the user select a desired satellite provider **286**. To reach program guide menu page **500** from welcome page **200** (FIG. **2**) or pick again page **320** (FIG. **5**), the user selects program guide option **288**.

Select a city option **322** (FIG. **5**) requires that the user enter information specifying a particular city. The user reaches program guide menu page **500** from local cable site page **350** (FIG. **6**) after the user submits the city information by clicking on submit button **330**.

Regardless of which option is used to reach program guide menu page **500** (FIG. **8**), information is preferably retained by the system that indicates which selections have been made by the user. Retaining this information allows subsequently displayed program listings and other information to be automatically customized to reflect the user's selections.

As shown in FIG. **8**, program guide menu page **500** may be constructed from two smaller web pages: top web page **502** and a bottom web page **504**. Top web page **502** contains graphics and text-based options **508** that are common to many different system operators. Bottom web page **504** may contain system specific promotional materials, such as pay-per-view video promotion **506**. Dividing program guide menu page **500** in this way allows system resources to be used more efficiently than would otherwise be possible, because the common material in top web page **502** can be used for more than one local cable system.

Options **508** allow the user to choose how to display various program listings for the user's preselected region of interest (national, satellite, or local). Typical options **508** include by time option **510**, by channel option **512**, by category option **514**, and search option **516**. The user may, based upon category options **514**, locate an event by choosing the corresponding category. If the event sought by the user is a game in progress which is being televised, then the user may select sports as the category by which program listings are to be displayed. The user may thus be able to locate the sporting event of interest along with its real-time embedded data and any associated supplemental information.

If by time option **510** is selected, the user is presented with by time page **600**, as shown in FIG. **9**. By time page **600** contains program listings **620** that are organized in channel order from top to bottom and by broadcast time from left to right. In by time page **600**, the programs in program listings

620 may be listed beginning with programs that are currently being broadcast. For example, if the current time is between 1:30 P.M. and 2:00 P.M., program listings 620 may begin with programs that start at 1:30 P.M. Programs in program listings 620 that are reflective of televised events in progress provide dynamic information about those events by way of embedded real-time data 650. Embedded real-time data 650 may be displayed adjacent to a program title, as shown in FIG. 9. Program listings 620 can be identified as events in progress by stating that the broadcast is "LIVE" and/or by distinguishing the appearance of live program listings from those that are prerecorded by virtue of color, text, etc.

If the user is aware that a televised event is in progress, the user may use by time option 510 or other suitable display option to display the desired program listing. The user can visually locate the program listing of interest and the corresponding real-time data within the listing because of its distinguishing appearance.

The user can also select the search option 516 and can search for program listings by title, channel, rating, etc. The user may search for televised sporting events in progress by selecting a channel dedicated to sports. Similarly, if the user knows the title of a sporting event and wishes to view the current score or other information in real time, the event and its corresponding embedded real-time data can be located by conducting a search by title.

Cursors 622 and 624 (FIG. 9) are used to navigate to earlier or later time periods, respectively. Web browser cursors 626 and 628 allow the user to scroll through the program listings. The user may also navigate the program listings with time navigation buttons 630. For example, if the user would like to view program listings that begin in the morning, the user clicks on the morning navigation button 630. If the user would like to view program listings for programs currently being broadcast, the user may click on the current navigation button 630. Program listings for different days in the month may be viewed by selecting the appropriate day from calendar buttons 632. Similarly, information regarding events televised live in the past can be viewed by the user by selecting the day of the event from the calendar. The program listing displayed in that event would reflect the final score, if the event was a game, in addition to other information that was made available to the user at the time the event was being televised.

The user can choose between various available view options by selecting the appropriate time, channel, category, or search button from among view buttons 634. View buttons 634 take the user to the same web pages that are presented when the corresponding options 508 of FIG. 8 are selected. For example, by channel option 512 and channel view button 634 are both linked to by channel page 760 (FIG. 11).

Another component of by time page 600 and various other web pages provided by the present system is program information box 636. Program information box 636 provides supplemental information on the selected television program listing. The contents of program information box 636 change as different program titles are selected from program listings 620. For example, the user has clicked on the entry "Knicks v. Bulls" in program listings 620 of FIG. 9. As a result, the contents of program information box 636 reflects this selection. If the program title selected by the user corresponds to an event in progress which is being televised (e.g., a basketball game), then program information box 636 may reflect static as well as dynamic information about the event. In the above example, program information box 636 might contain static information such as the program title (e.g., Knicks v. Bulls) or the running time of the program (e.g., 2:45). Program information box 636 might also contain real-time data such as the current score (e.g., Knicks: 43; Bulls: 42, half time . . .), highlights of the game (e.g., Knicks first lead in the game, shot putting Knicks ahead made by Patrick Ewing at half time buzzer . . .). Program information box 636 may be customized to reflect additional information in a different sequence as well.

If the user selects a program that is not a televised event in progress, the program information box 636 provides solely static information pertaining to the selection made by the user. For example, if the user selects a movie, then the program information box 636 typically contains the program title (e.g., Primal Fear), the running time of the program (e.g., 2:09), a brief description of the program (e.g., A hot shot . . .), and a description of the program type or genre (e.g., drama movie). The program description may contain information on the actors in the program, the director, etc. Program information box 636 typically provides a rating of the program, such as a star rating (e.g., three stars) or the Motion Picture Association of America (MPAA) rating for movies or the television rating for television programs.

If the user desires to view additional supplemental information relating to the selected program, the user may click on closer look icon 638 (or alternatively, on any portion of box 636), which takes the user to program information page 700 (FIG. 10). Program information page 700 may provide both static and dynamic information relating to the selected program listing. If the program listing selected by the user is for a televised game in progress, the information displayed on program information page 700 could reflect the statistics 702 of the teams and/or individuals that are playing. In addition, additional information could also include video stills, video and/or audio clips of key shots made or missed by players 720, interview segments 725, etc. A user can also click on a graphic or text link to the web site of a network or other source of information.

By channel page 760 of FIG. 11 is presented when the user selects by channel option 512 from program guide menu page 500 (FIG. 8) or when the user clicks on a channel view button, such as channel view button 634 of by time page 600 (FIG. 9). By channel page 760 contains channel list 762. Channel list 762 may be arranged in channel number order and may contain associated icons 764 for certain channels. A user can click on each individual channel 766 in channel list 762 to obtain a list of program information based on the selected channel. For example, the user may select a sports channel to view dynamic information pertaining to a game in progress being televised on that particular channel.

When a channel 766 is selected, the user is presented with channel program list page 800, as shown in FIG. 12. The selected channel in the example of FIG. 12 is channel 2. In channel program list page 800, program listings 802 for the selected channel may be arranged in time order, beginning with the current time. If programs in program listings 802 extend into the next day, the programs may be separated by date separation bar 804. Embedded real-time data may appear with the program name in program listings 802, as real-time weather data 807 appears next to the title "College Football Army vs. Navy" in FIG. 12. Title bar 806 contains information identifying the currently selected channel.

By category page 840 of FIG. 13 is presented when the user selects by category option 514 from program guide menu page 500 (FIG. 8) or when the user clicks on a

category view button, such as category view button **634** of by time page **600** (FIG. **9**). By category page **840** contains category list **842**, which may be presented in the form of category icons **844**. A user can click an individual category icon **844** in category list **842** to obtain a list of program information based on the selected category. For example, the user may choose sports as a category to view a list of sports programs.

When a category is selected, the user is presented with category program list page **860**, as shown in FIG. **14**. In category program list page **860**, program listings **862** may be arranged in time and channel order, beginning with the current time and date. Although the category program list page **860** depicted in FIG. **14** is based upon the selection of the movies category, a similarly arranged sports category program list would have been displayed had the user selected the sports category. Moreover, if the sports event was then in progress and being televised, embedded real-time data would appear with the program name in program listings **862**. Program listings **862** contain the channel information for each program adjacent to the program title. If a user wishes to view program information for a given channel, the user may click on one of the displayed channels. The user is then presented with a program list that is restricted to programs appearing on the selected channel.

If desired, the program list that is displayed in category program list page **860** may be limited to programs appearing in the next 24 hour period. The user may view information for later days by clicking on the appropriate day in calendar buttons **866**.

The foregoing is merely illustrative of the principles of this invention and various modifications can be made by those skilled in the art without departing from the scope and spirit of the invention.

What is claimed is:

1. An Internet television program guide system for providing television program listings with embedded real-time data to a user at a multimedia system over an Internet communications link, comprising:

a computer system for providing television program listings with embedded real-time data, said real-time data corresponding to events being televised live; and

a web server for receiving the television program listings with embedded real-time data from the computer system and for providing the television program listings with embedded real-time data corresponding to events being televised live to the multimedia system over the Internet communications link when the user accesses the television program listings with embedded real-time data using the multimedia system.

2. The system defined in claim **1** wherein the computer system comprises a media library containing video clips.

3. The system defined in claim **1** wherein the computer system comprises a data server on which at least part of the television program listings are stored.

4. The system defined in claim **1** wherein the computer system comprises means for receiving the real-time data from a real-time data processing facility.

5. The system defined in claim **4** wherein the real-time data processing facility supplies real-time sports scores.

6. The system defined in claim **4** wherein the real-time data processing facility supplies real-time weather data.

7. The system defined in claim **1** wherein the computer system comprises means for providing real-time data containing textual information.

8. The system defined in claim **1** wherein the computer system comprises means for providing real-time data containing video images.

9. The system defined in claim **1** wherein the computer system comprises means for providing real-time data containing video clips.

10. The system defined in claim **1** wherein the computer system comprises means for providing real-time data containing audio clips.

11. The system defined in claim **1** wherein the computer system comprises means for providing real-time data containing combinations of textual information, video clips, video images, and audio clips.

12. The system defined in claim **1** further comprising means for accessing the embedded real-time data by displaying corresponding television program listings.

13. The system defined in claim **1** further comprising means for providing a go national option which the user selects to receive real-time data embedded within national television program listings.

14. The system defined in claim **1** further comprising means for providing a go satellite option which the user selects to receive real-time data embedded within satellite television program listings.

15. The system defined in claim **1** further comprising means for providing a go local option which the user selects to receive real-time data embedded within local television program listings.

16. The system defined in claim **15** further comprising means for selecting a locality for the local television program listings.

17. The system defined in claim **16** wherein the means for selecting a locality comprises means for accepting a zip code from which the locality is determined.

18. The system defined in claim **16** wherein the means for selecting a locality comprises means for selecting a local region from a map.

19. The system defined in claim **15** further comprising means for presenting a pick again web page when television program listings are not available for the selected locality.

20. The system defined in claim **1** further comprising:

means for providing a program guide option; and

means for presenting a program guide menu web page when the user selects the program guide option.

21. The system defined in claim **1** further comprising means for providing a selectable option to arrange the television program listings by time.

22. The system defined in claim **1** further comprising means for providing a selectable option to arrange the television program listings by channel.

23. The system defined in claim **1** further comprising means for providing a selectable option to arrange the television program listings by category.

24. The system defined in claim **23** wherein one of the categories is sports.

25. The system defined in claim **1** further comprising means for searching the television program listings.

26. The system defined in claim **25** further comprising means for searching the television program listings by title.

27. The system defined in claim **25** further comprising means for searching the television program listings by category.

28. The system defined in claim **1** further comprising means for allowing a user to select a given one of the television program listings with embedded real-time data.

29. The system defined in claim **28** further comprising means for providing supplemental information on the selected television program listing with embedded real-time data.

30. The system defined in claim **29** wherein the supplemental information is real-time information on same display screen.

31. The system defined in claim 29 wherein the supplemental information is real-time and non-real-time information on a web page.

32. The system defined in claim 1 wherein the computer system further comprises means for providing multimedia material associated with a television program selected by the user to a web server.

33. The system defined in claim 32 wherein the means for providing multimedia material comprises means for providing interview video segments.

34. The system defined in claim 1 further comprising a satellite transmission link between the computer system and the web server.

35. The system defined in claim 1 wherein:

the Internet communications link comprises a telephone line; and

the web server provides web pages to the multimedia system over the telephone line.

36. A method for providing television program listings with embedded real-time data to a user at a multimedia system over an Internet communications link using an Internet television program guide system having a computer system and a web server, the method comprising the steps of:

providing television program listings with embedded real-time data with the computer system, said real-time data corresponding to events being televised live;

receiving the television program listings with embedded real-time data from the computer system with the web server; and

providing the television program listings with embedded real-time data corresponding to events being televised live to the multimedia system over the Internet communications link with the web server, so that the user can access the television program listings with embedded real-time data.

37. The method defined in claim 36 further comprising the step of receiving real-time data supplied by a real-time data processing facility with the web server.

38. The method defined in claim 37 further comprising the step of embedding the real-time data received from the real-time data processing facility within corresponding television program listings.

39. The method defined in claim 36 further comprising the step of providing multimedia material associated with the television program listings to the web server with the computer system.

40. The method defined in claim 36 wherein the step of providing real-time data further comprises the step of providing real-time data containing textual information to the web server with the computer system.

41. The method defined in claim 36 wherein the step of providing real-time data further comprises the step of providing real-time data containing video images to the web server with the computer system.

42. The method defined in claim 36 wherein the step of providing real-time data further comprises the step of providing real-time data containing video clips to the web server with the computer system.

43. The method defined in claim 36 wherein the step of providing real-time data further comprises the step of providing real-time data containing audio clips to the web server with the computer system.

44. The method defined in claim 36 wherein the step of providing real-time data further comprises the step of providing real-time data containing combinations of textual information, video clips, video images, and audio clips to the web server with the computer system.

45. The method defined in claim 36 further comprising the step of providing a go national option which the user selects to receive real-time data embedded within national television program listings.

46. The method defined in claim 36 further comprising the step of providing a go satellite option which the user selects to receive real-time data embedded within satellite television program listings.

47. The method defined in claim 36 further comprising the step of providing a go local option which the user selects to receive real-time data embedded within local television program listings.

48. The method defined in claim 47 further comprising the step of selecting a locality for the local television program listings.

49. The method defined in claim 48 wherein the step of selecting a locality comprises the step of accepting a zip code from which the locality is determined.

50. The method defined in claim 48 wherein the step of selecting a locality comprises the step of selecting a local region from a map.

51. The method defined in claim 48 further comprising the step of presenting a pick again web page when television program listings are not available for the selected locality.

52. The method defined in claim 36 further comprising the steps of:

providing a program guide option; and

presenting a program guide menu web page when the user selects the program guide option.

53. The method defined in claim 36 further comprising the step of providing a selectable option to arrange the television program listings by time.

54. The method defined in claim 36 further comprising the step of providing a selectable option to arrange the television program listings by channel.

55. The method defined in claim 36 further comprising the step of providing a selectable option to arrange the television program listings by category.

56. The method defined in claim 36 further comprising the step of searching the television program listings.

57. The method defined in claim 56 further comprising the step of searching the television program listings by title.

58. The method defined in claim 56 further comprising the step of searching the television program listings by category.

59. The method defined in claim 36 further comprising the step of allowing a user to select a given one of the television program listings with embedded real-time data.

60. The method defined in claim 59 further comprising the step of providing supplemental information on the selected television program listing with embedded real-time data.

61. The method defined in claim 60 further comprising the step of providing supplemental real-time information on same display screen.

62. The method defined in claim 60 further comprising the step of providing supplemental real-time and non-real-time information on a web page.

63. The method defined in claim 36 further comprising the step of providing the television program listings to the web server with a satellite transmission link between the computer system and the web server.

64. The method defined in claim 36 wherein the Internet communications link comprises a telephone line, the method further comprising the step of providing web pages to the multimedia system over the telephone line.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,268,849 B1
DATED : July 31, 2001
INVENTOR(S) : Franklin E. Boyer et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page,
References Cited, OTHER PUBLICATIONS, change "Click TV" to -- ClickTV --;

Drawings,
FIG. 5, reference 326, change "ANNEAHEIM" to -- ANAHEIM --;
FIG. 7, under Current Conditions, change "HUMDIDITY" to -- HUMIDITY --;
FIG. 9, in listings (5 KTLA): change "SYLVESTOR" to -- SYLVESTER --;
FIG. 12, in listings (2:30PM): change "BASKTBALL" to -- BASKETBALL --;
FIG. 12, in listings (9:00PM): change "ENTERAINMENT" to -- ENTERTAINMENT --;
FIG. 14, in listings (1:00PM), change "BIRDCASE" to -- BIRDCAGE --.

Signed and Sealed this

Thirtieth Day of April, 2002

Attest:

Attesting Officer

JAMES E. ROGAN
Director of the United States Patent and Trademark Office